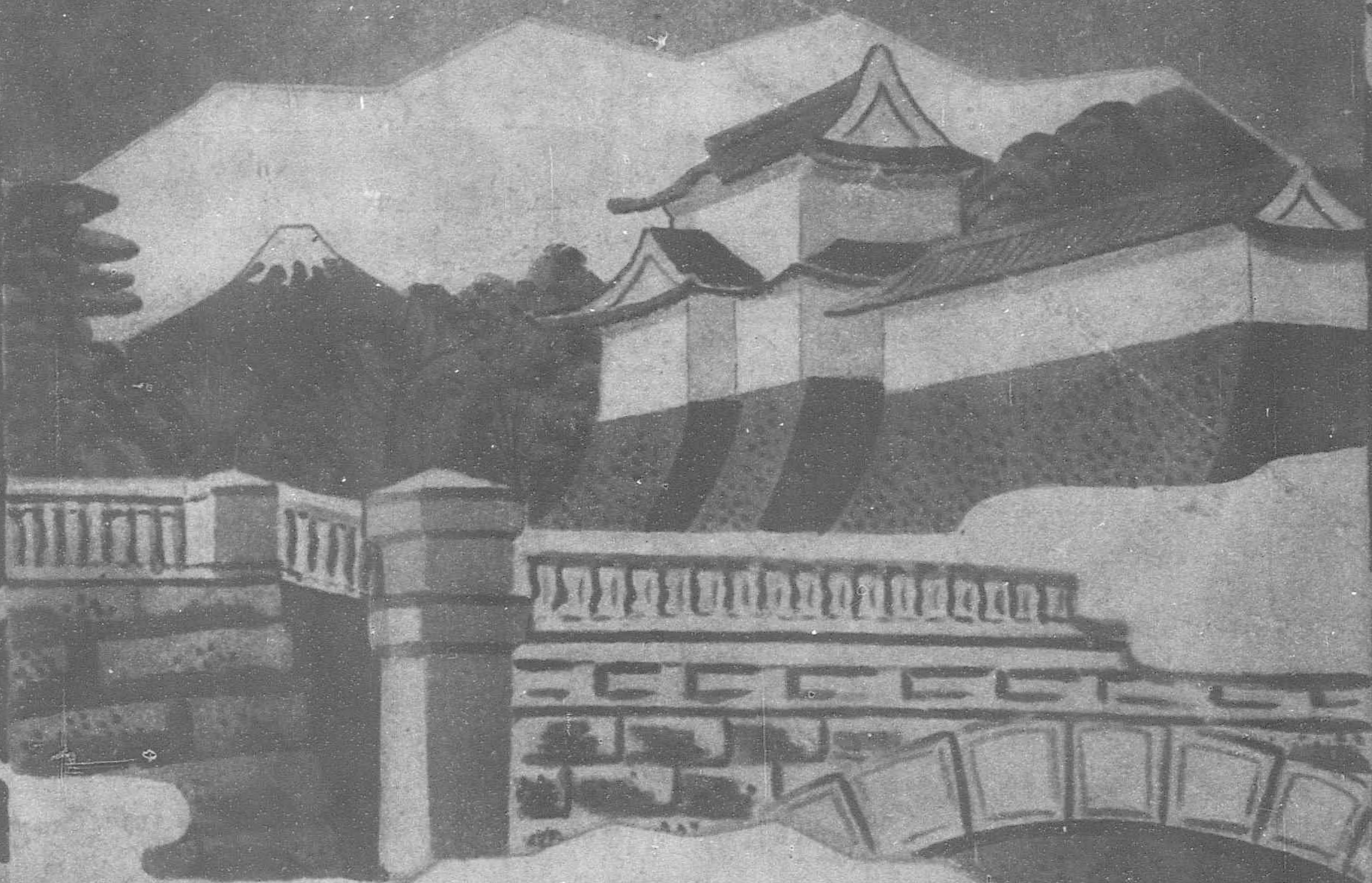


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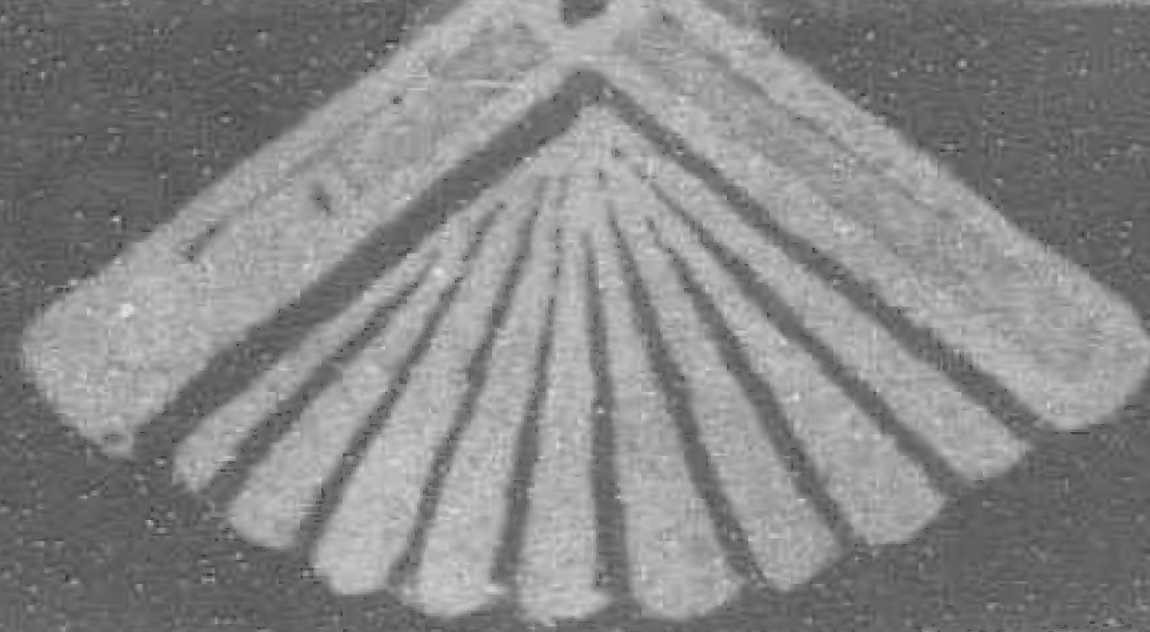
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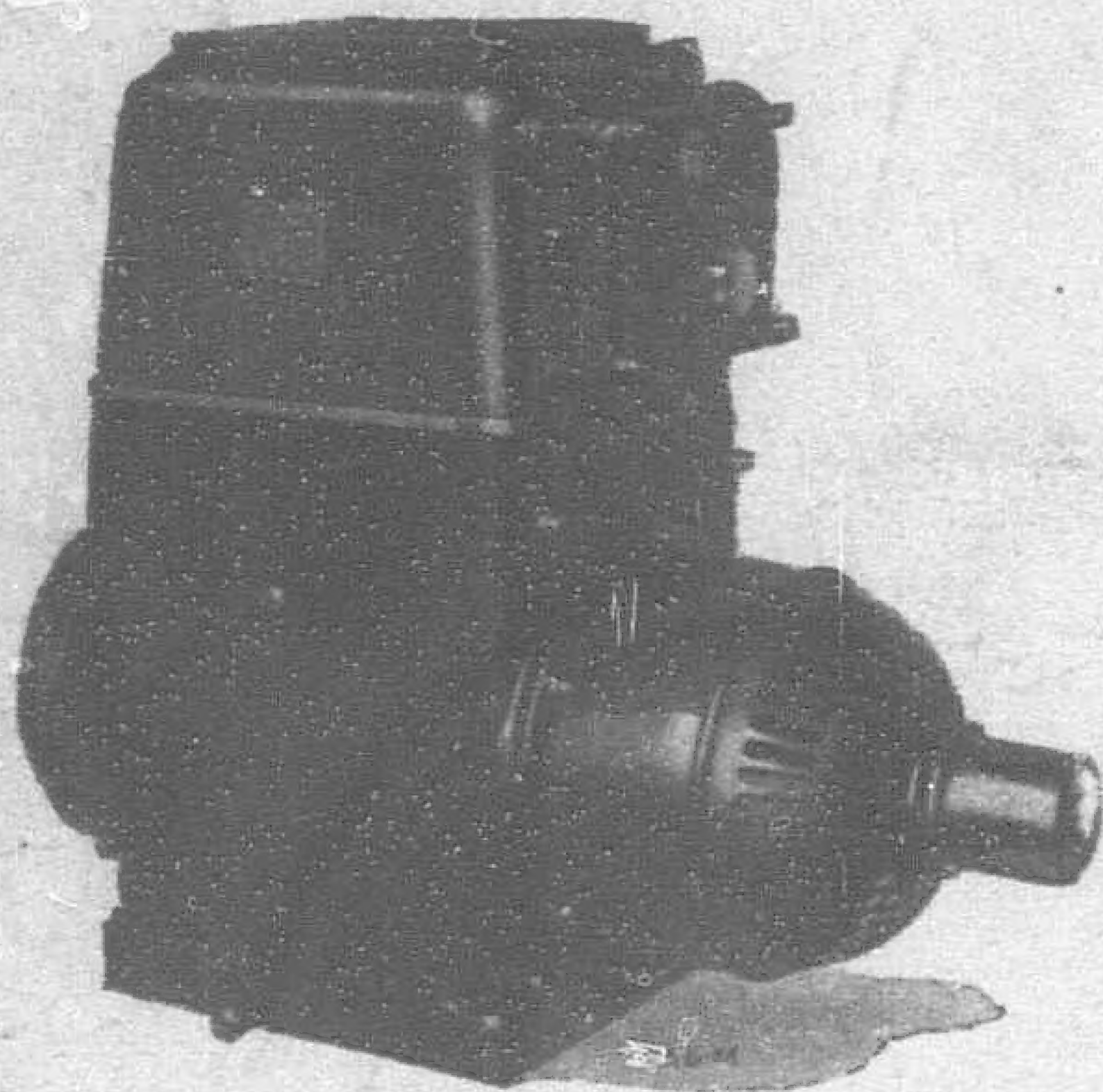
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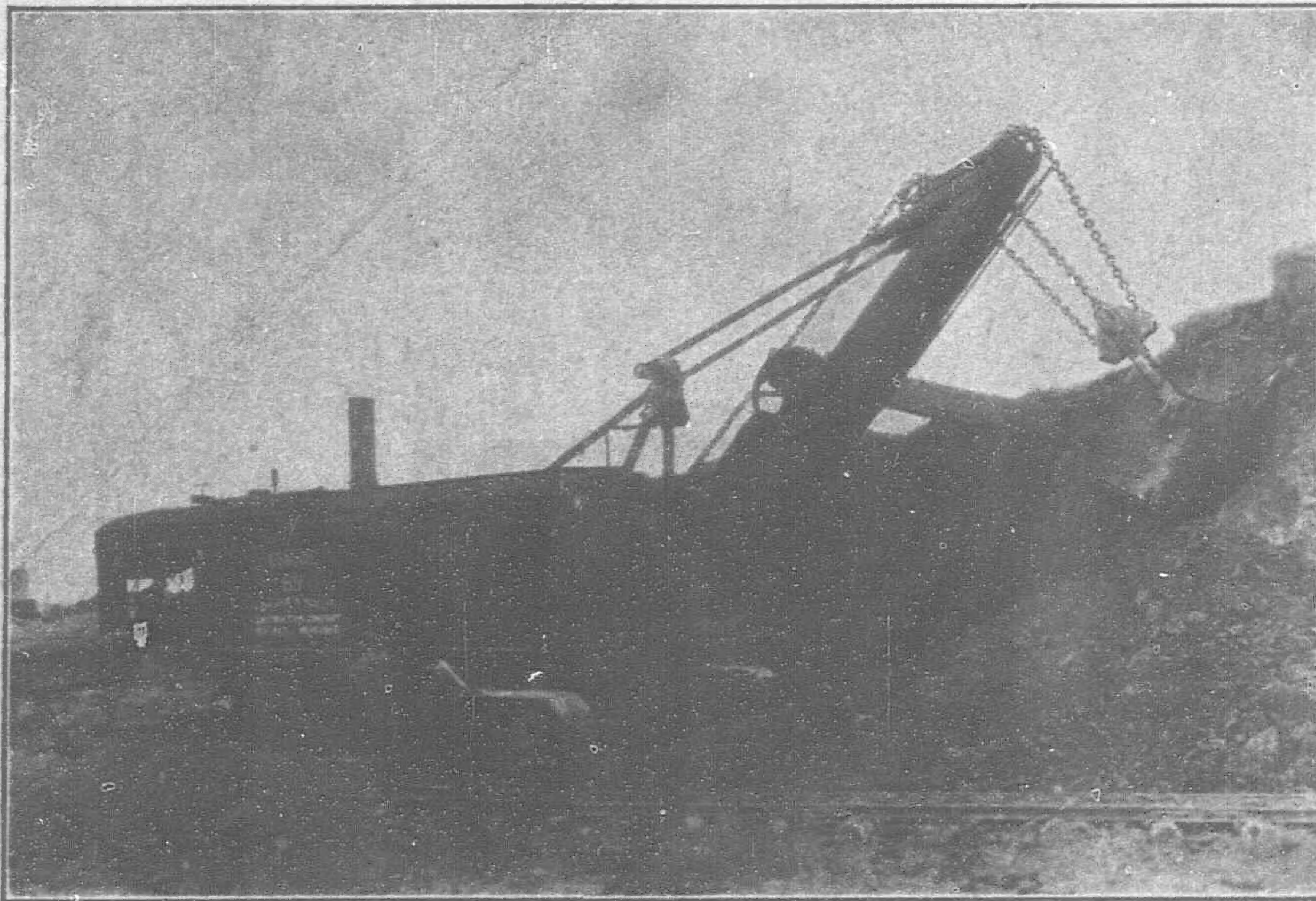
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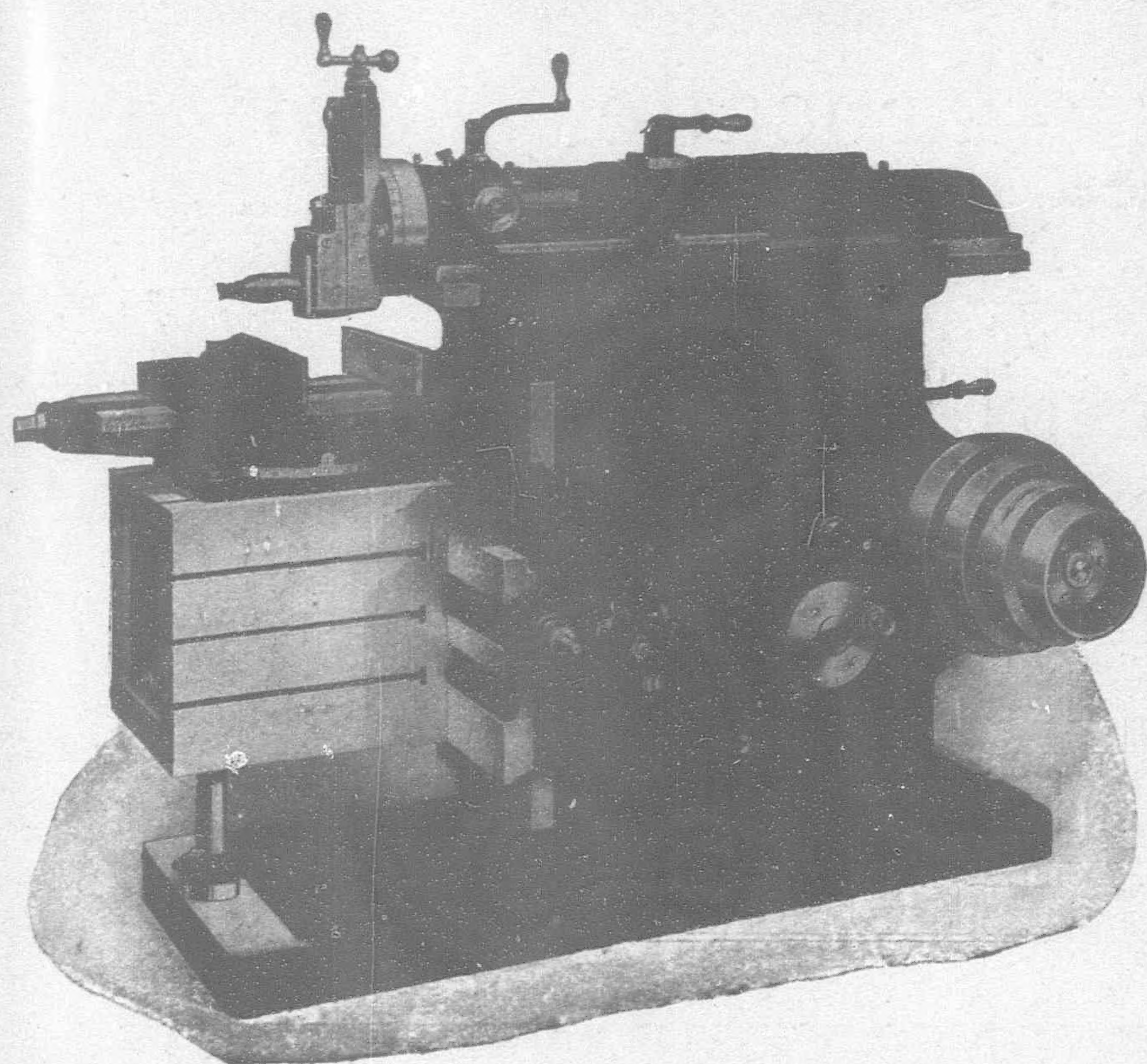
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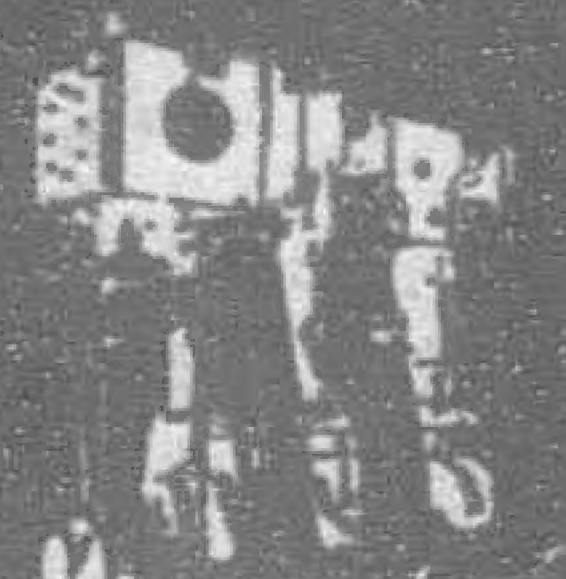
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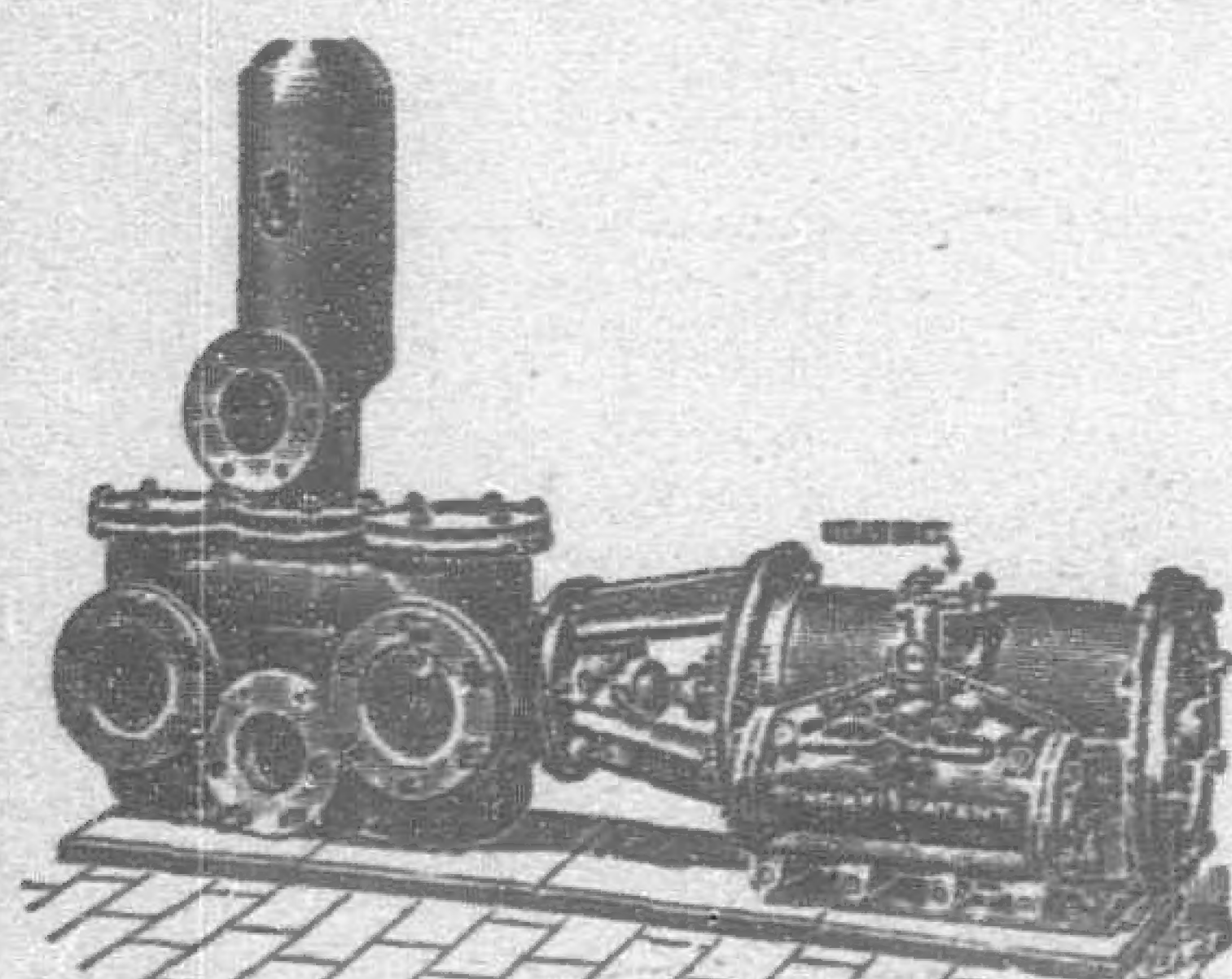
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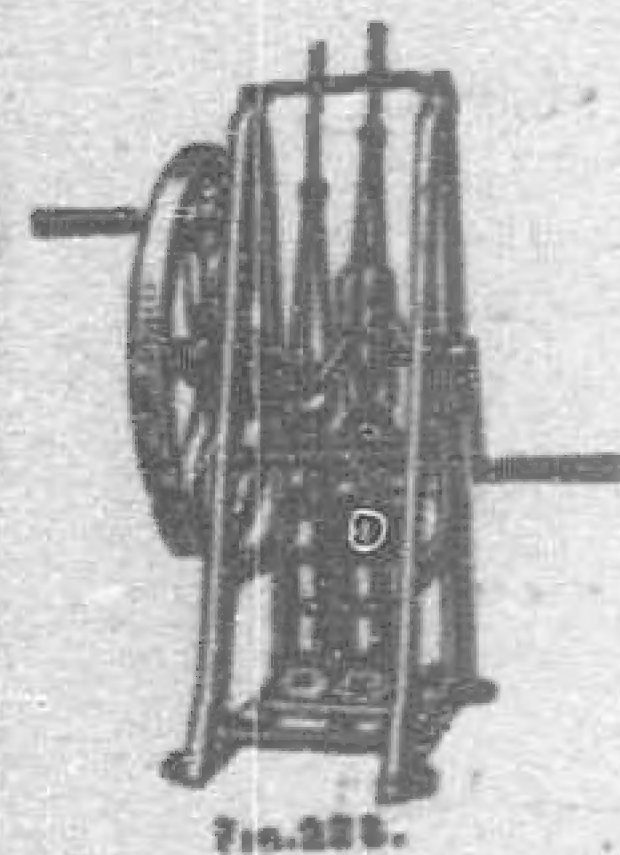
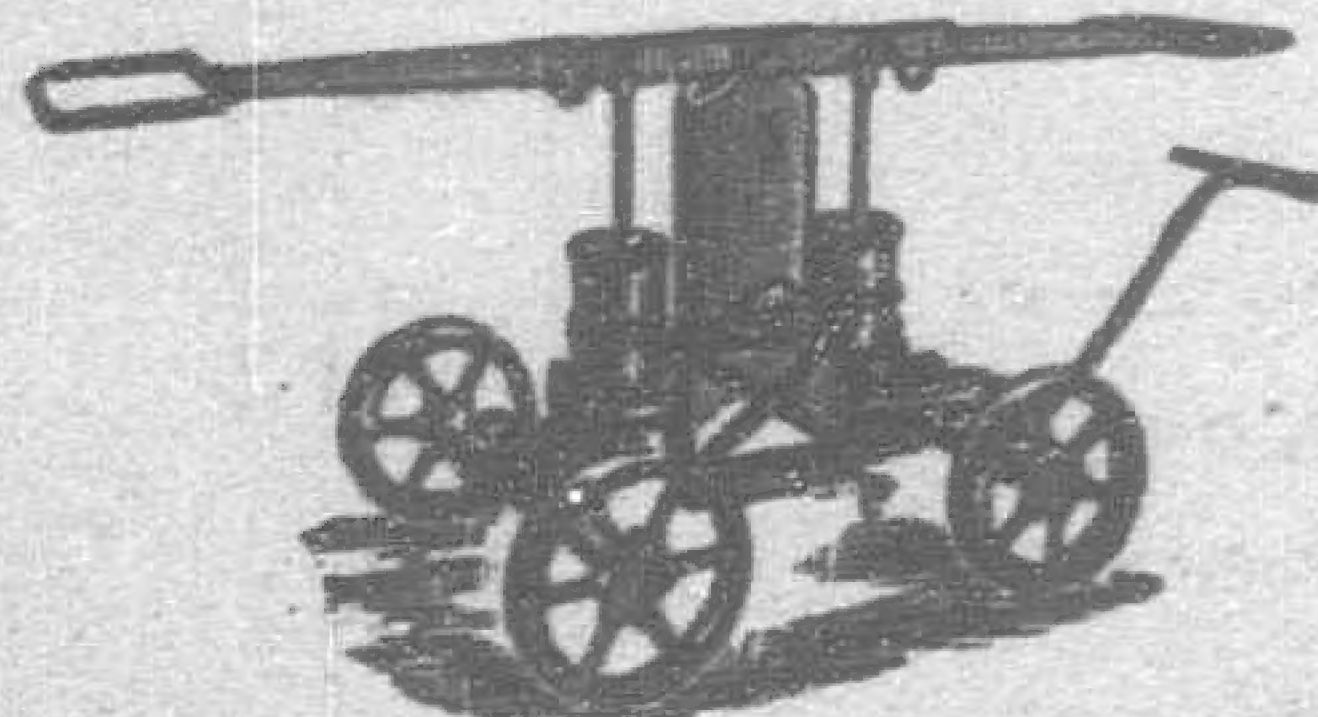


Fig. 155.



Fig. 160.

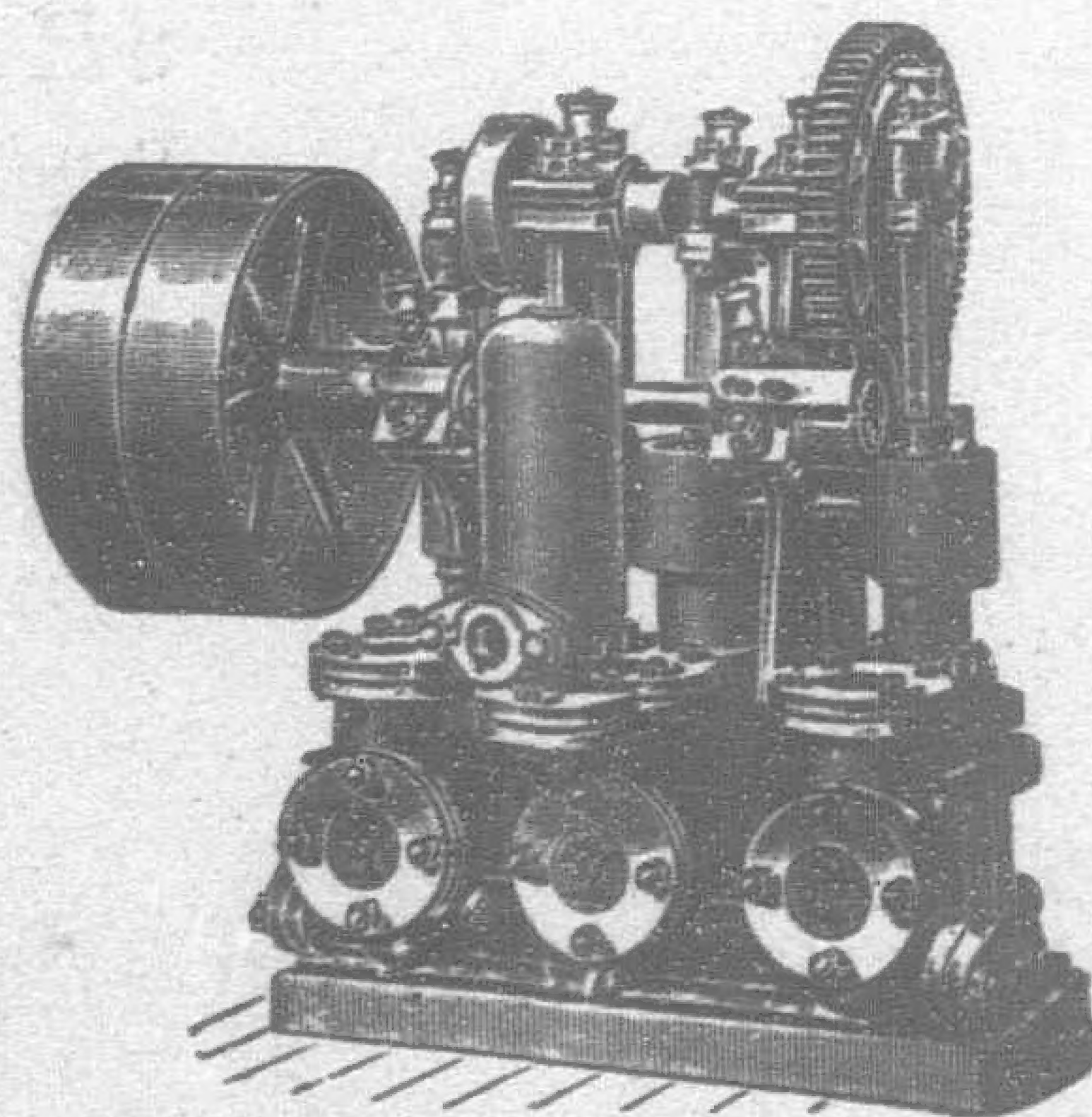


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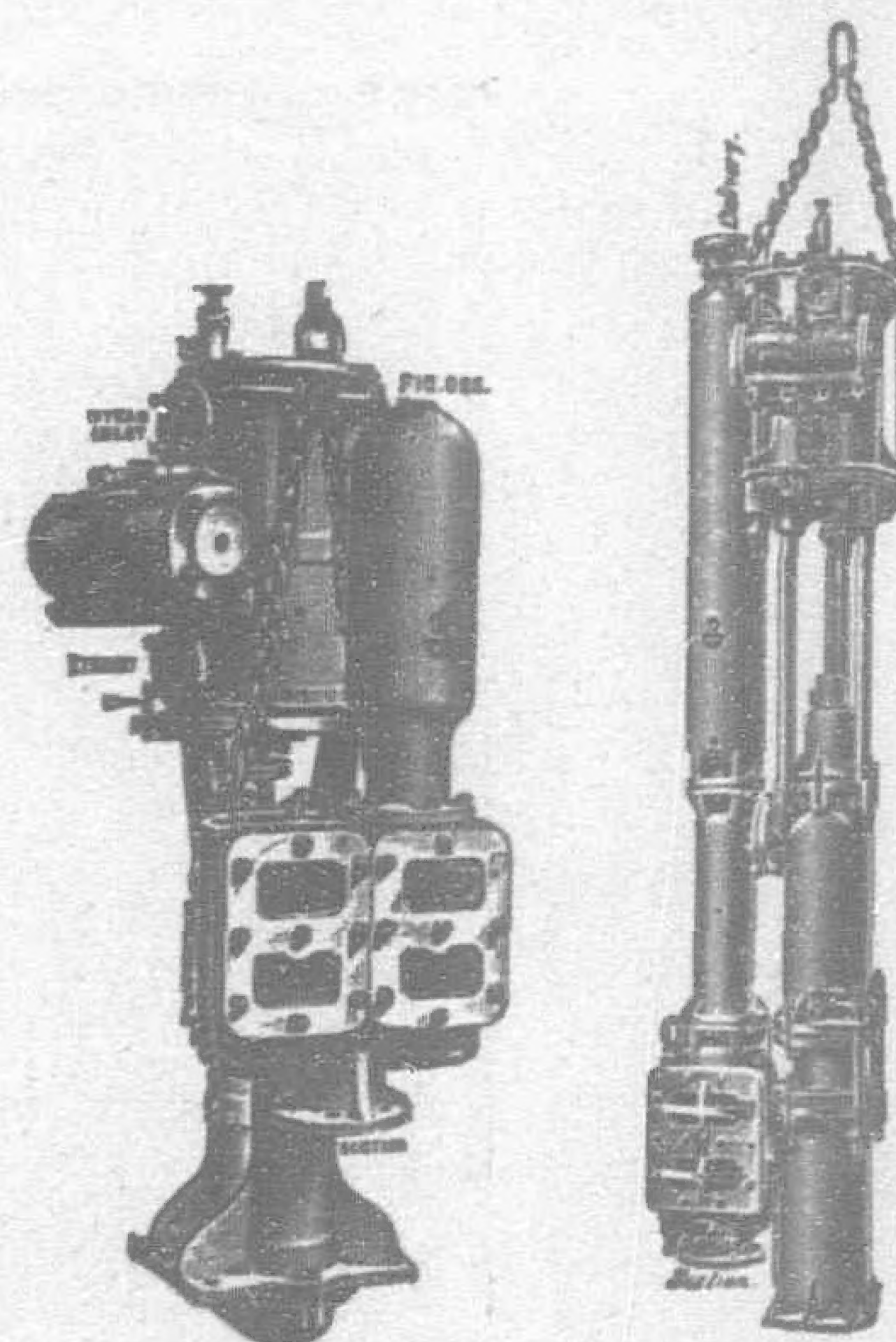
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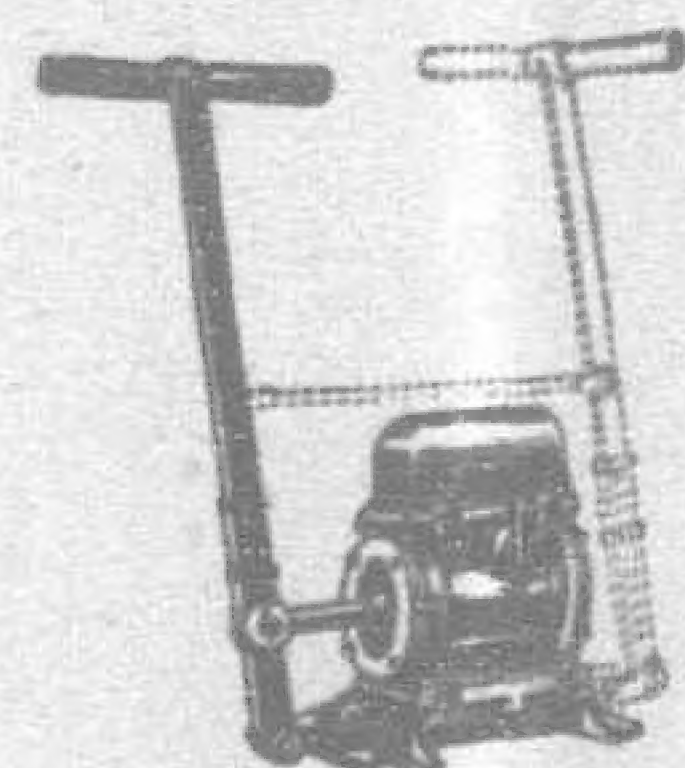
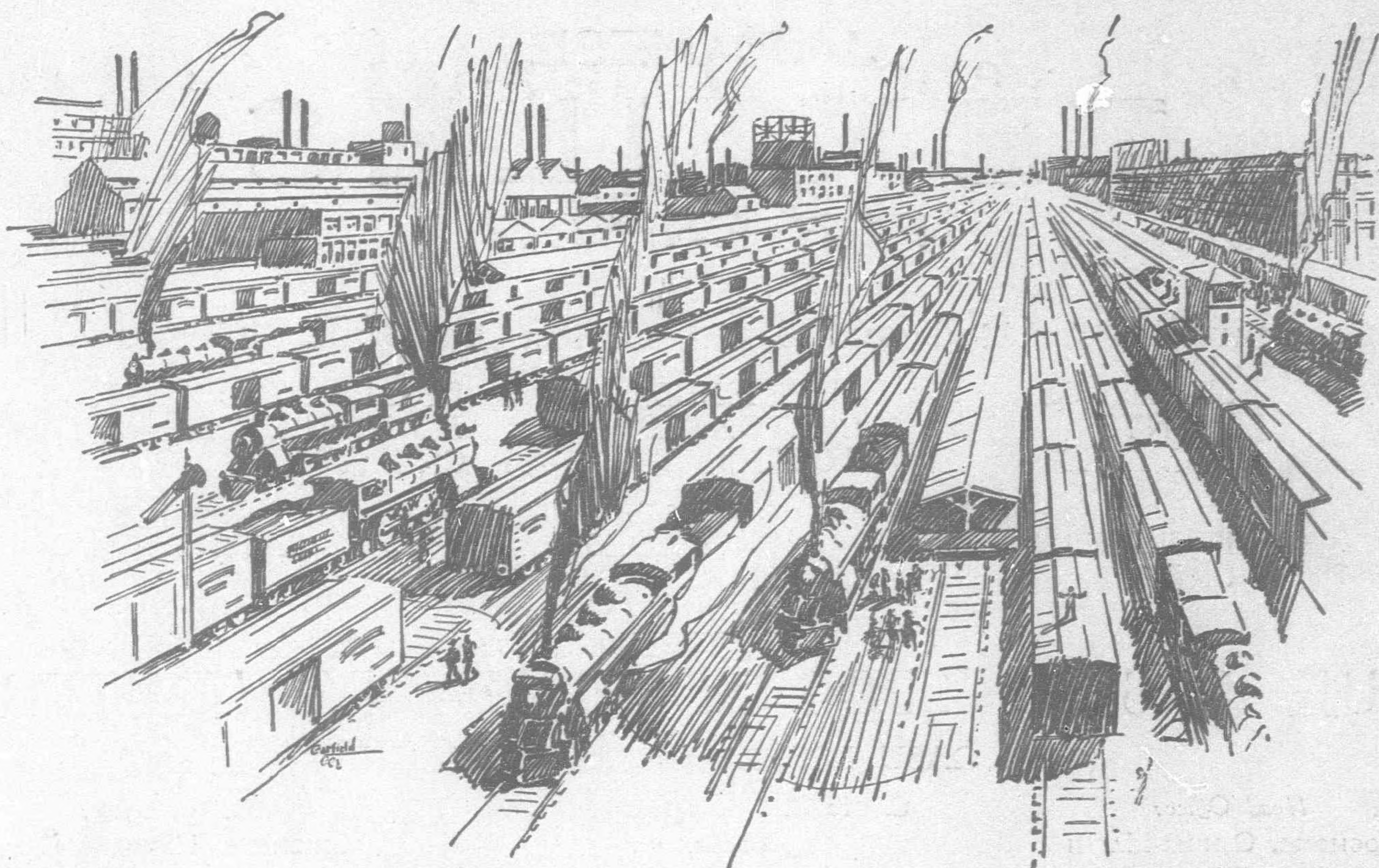


Fig. 185.





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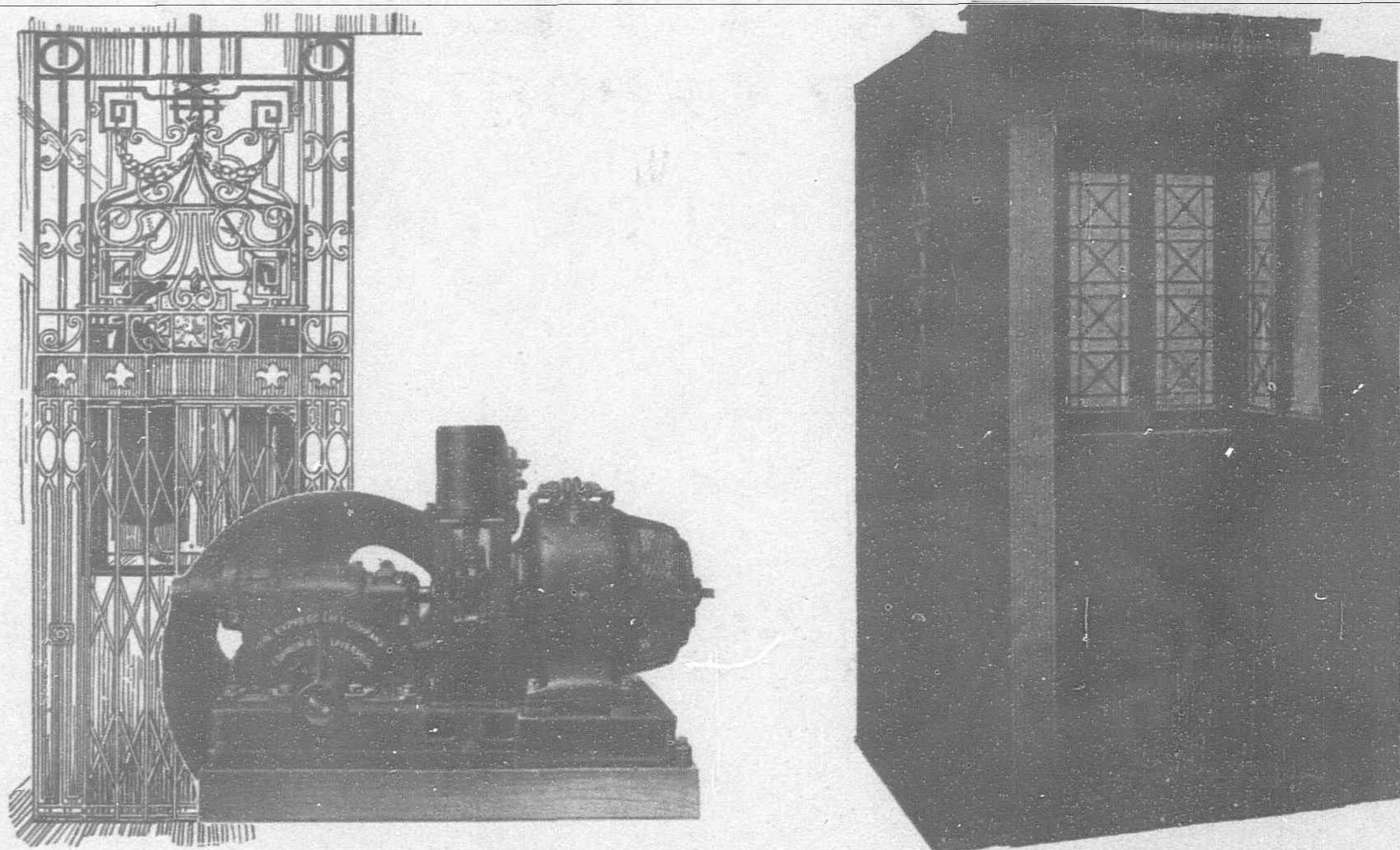
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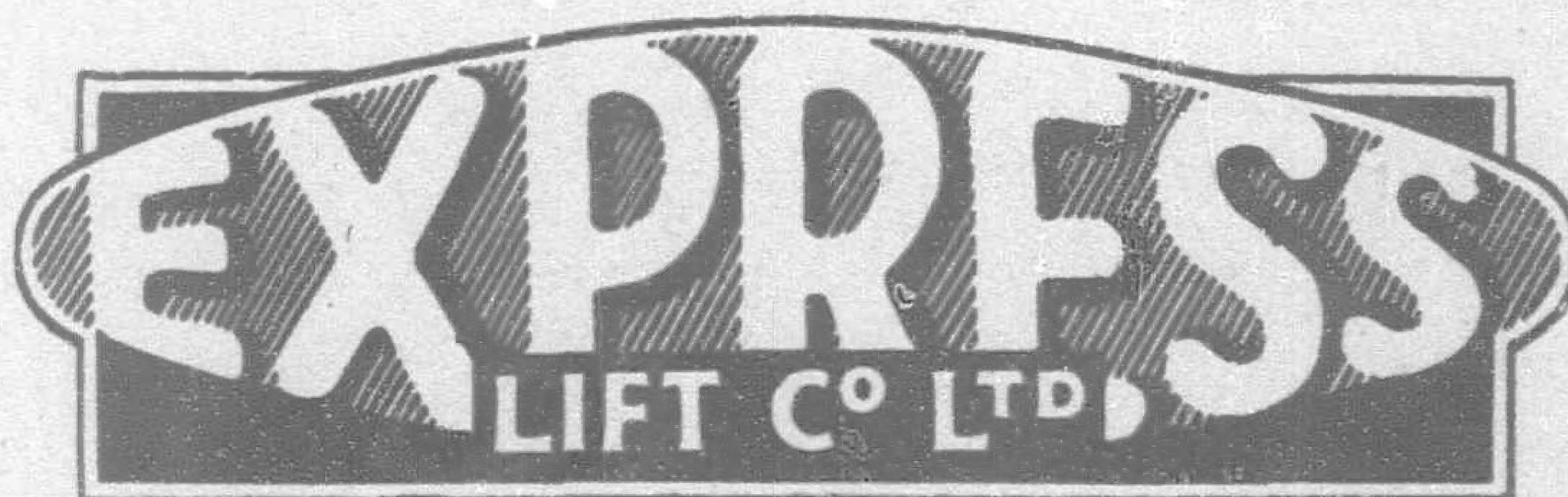
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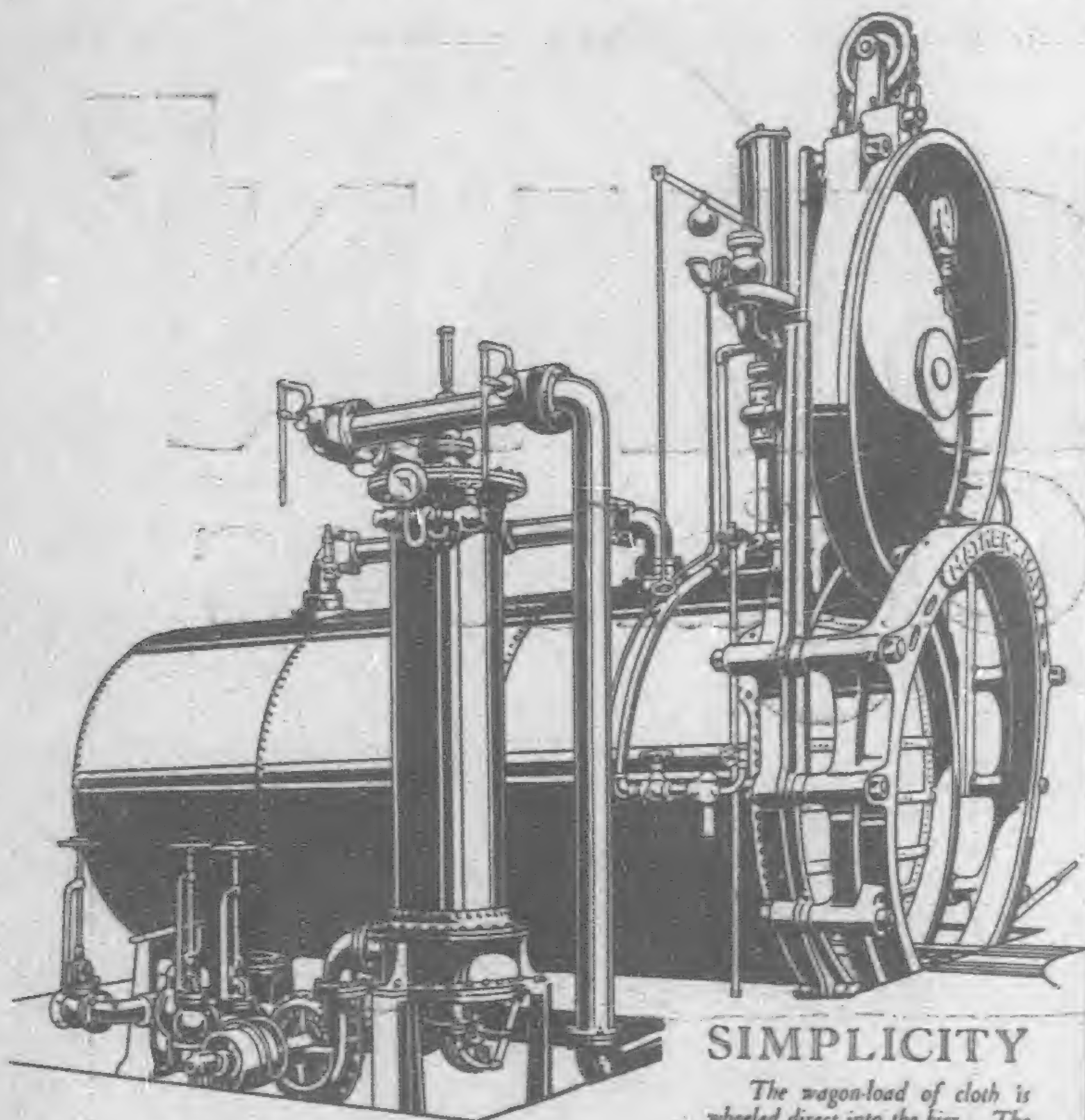
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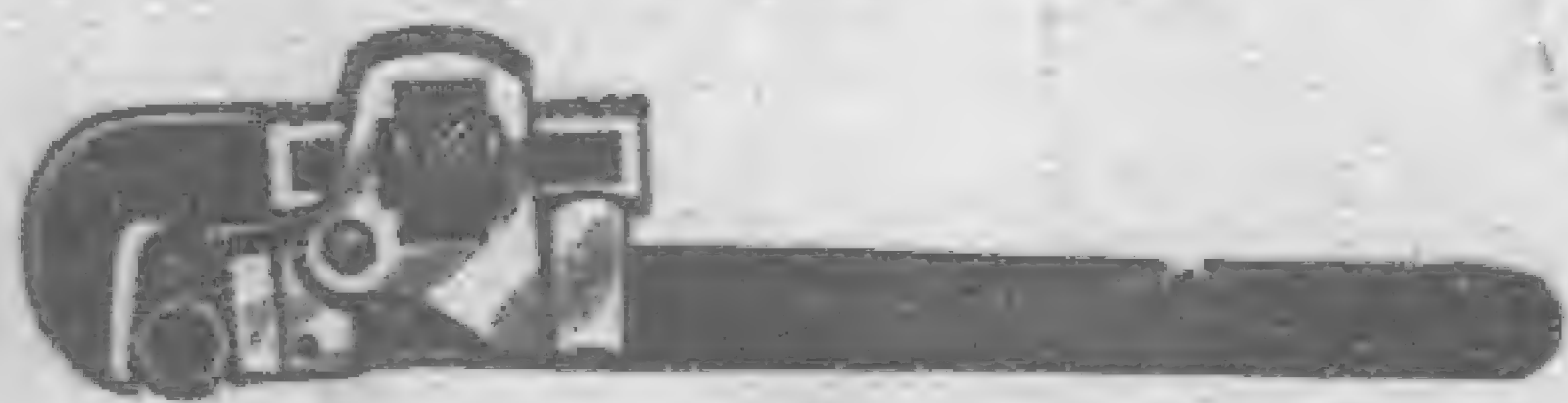
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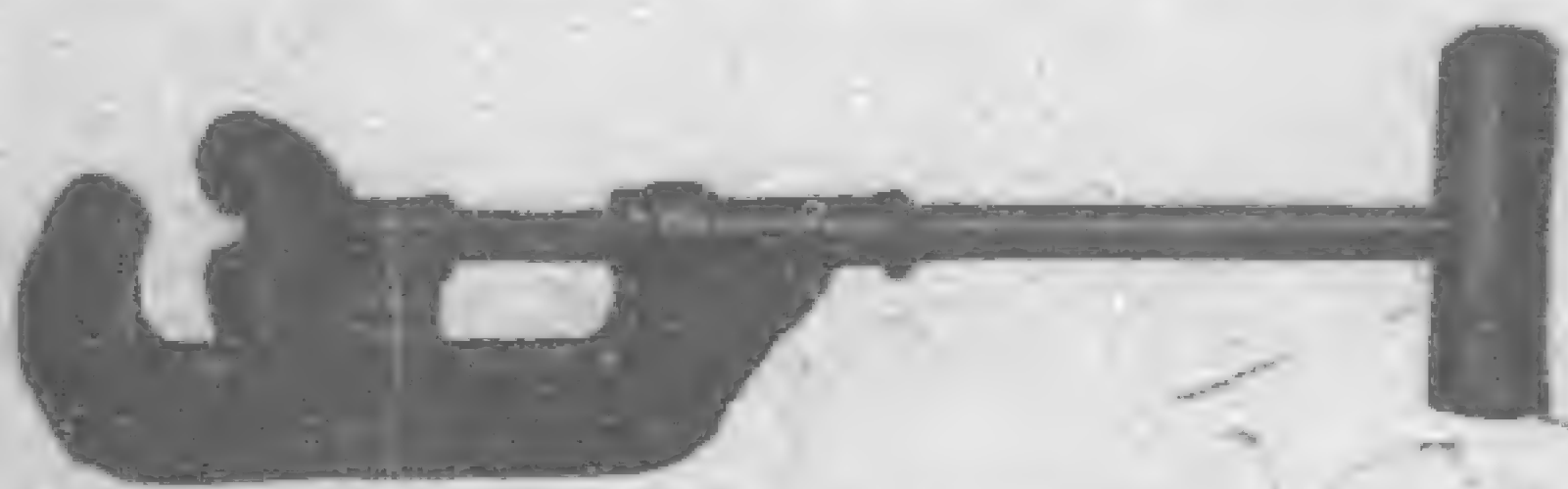
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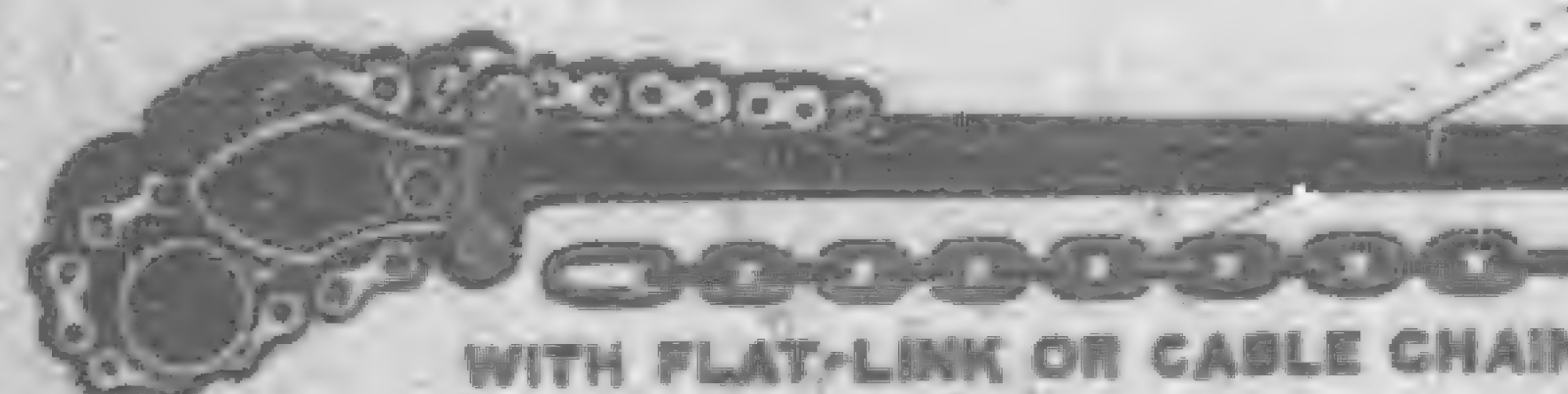
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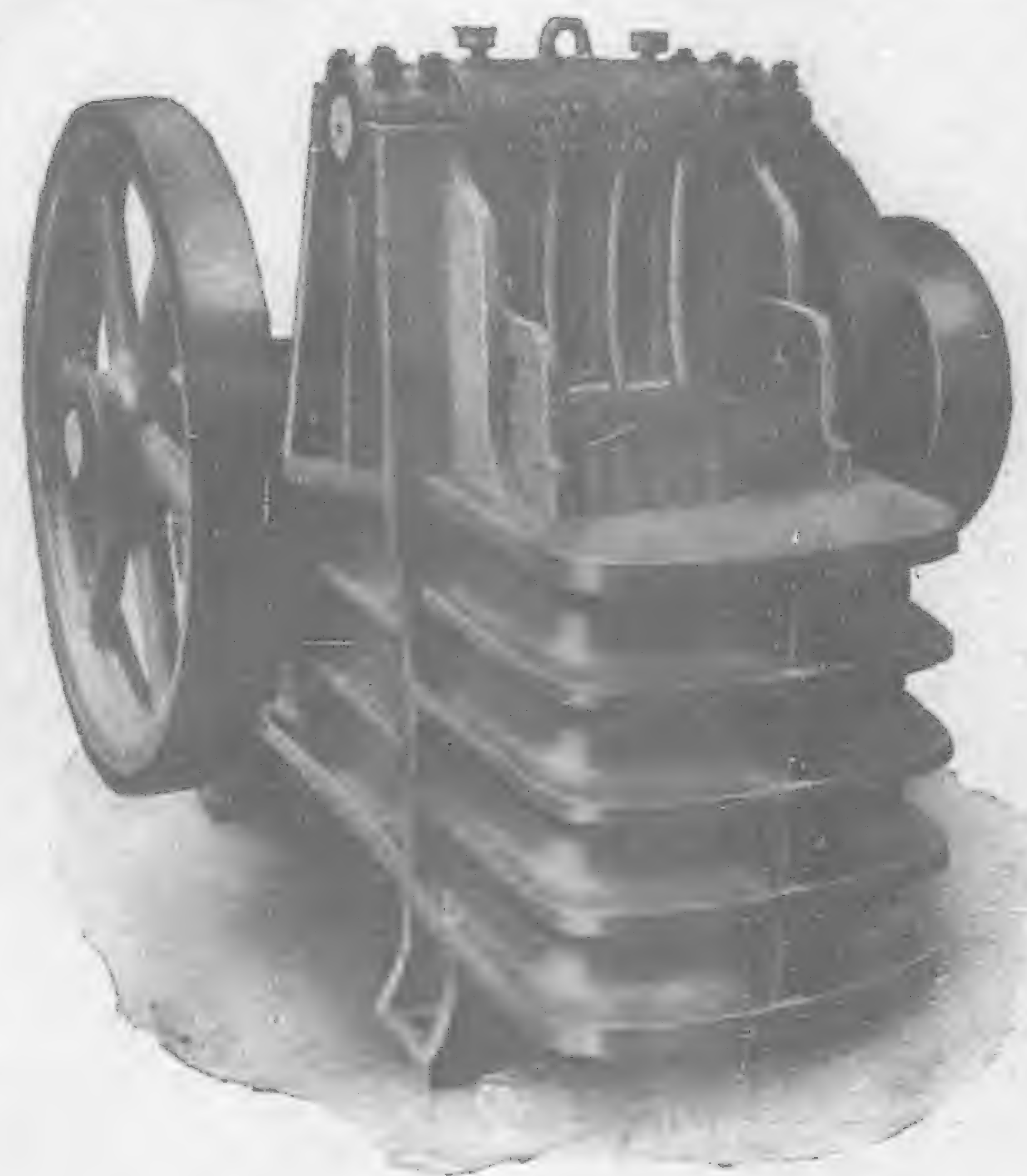
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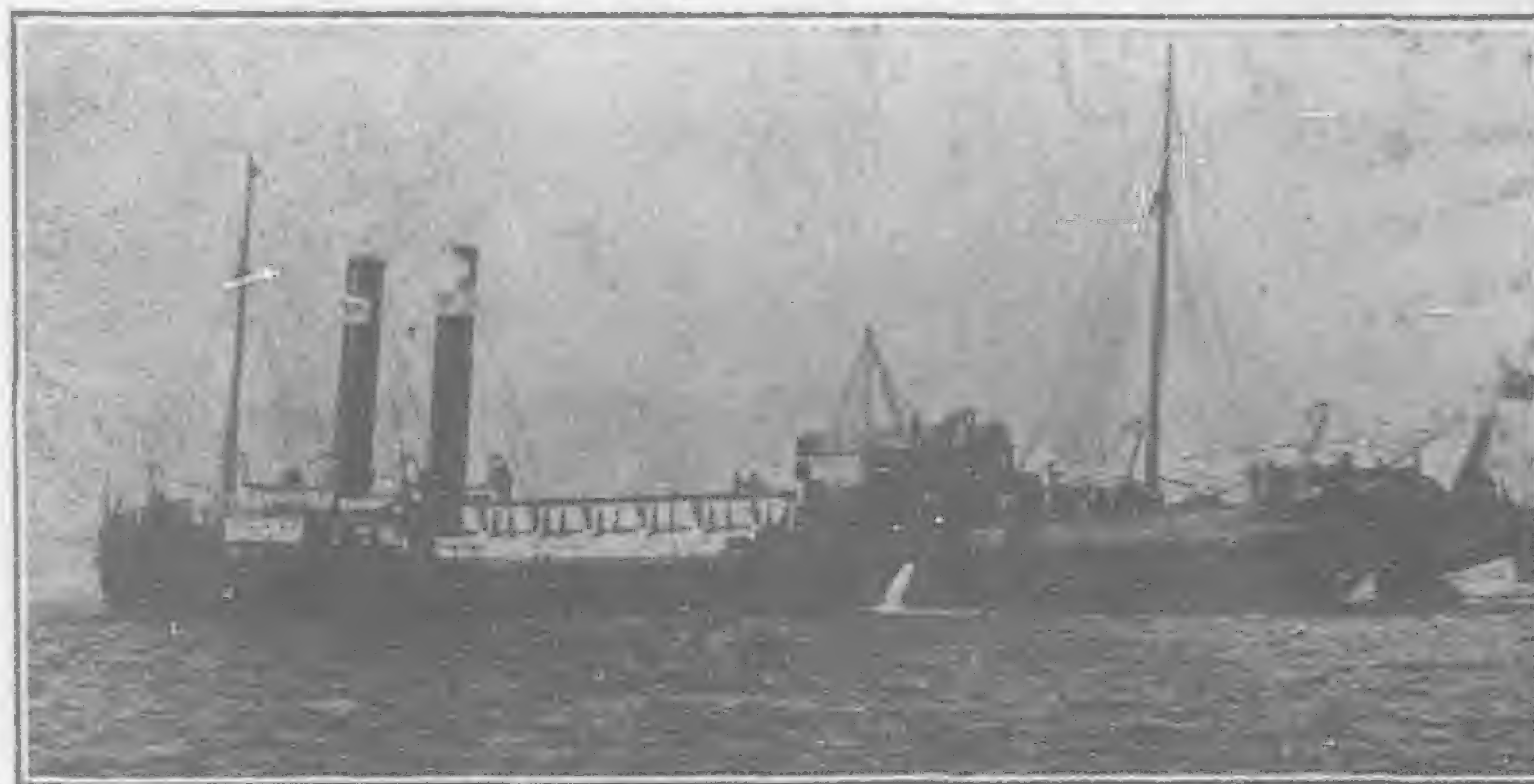
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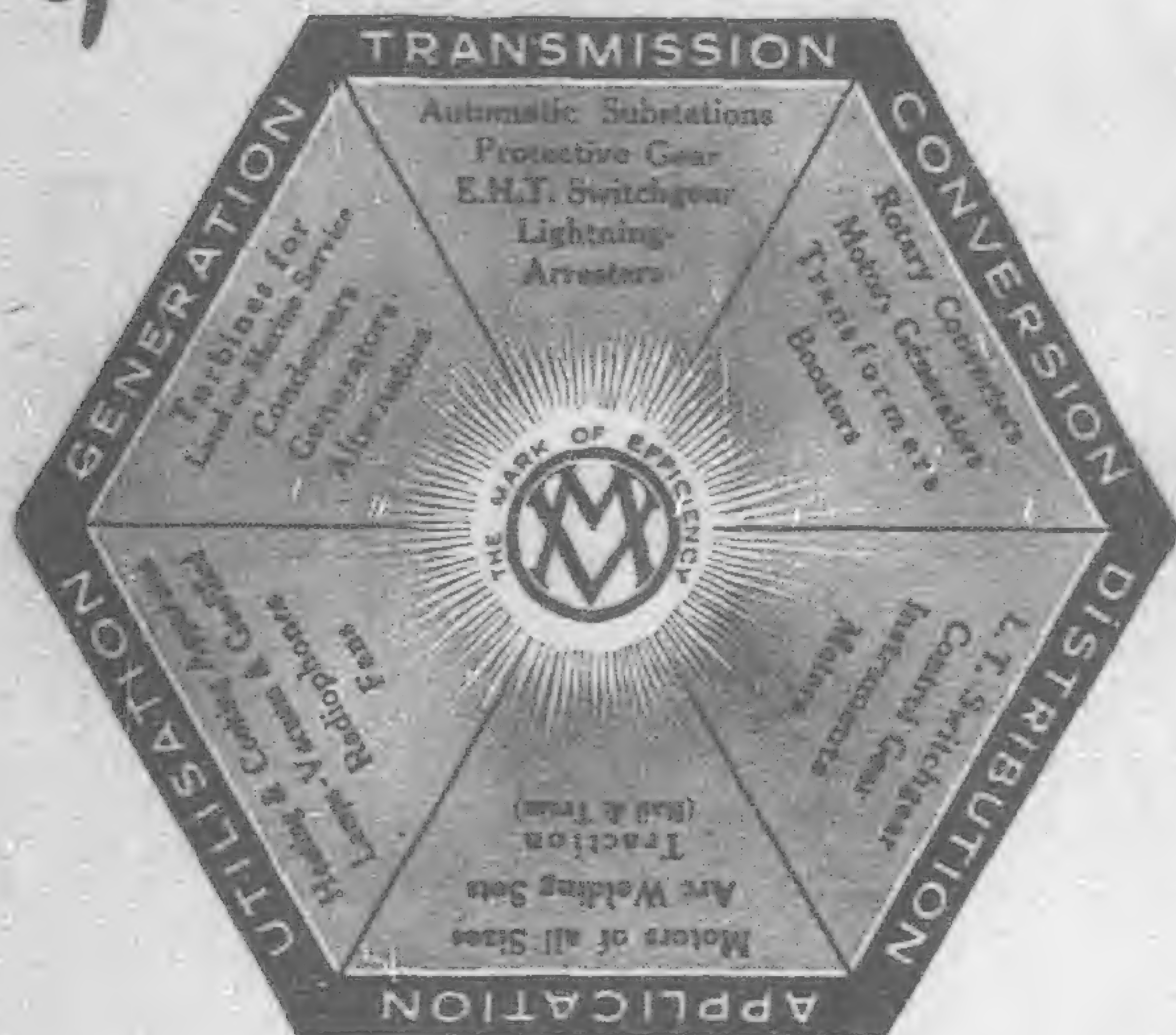
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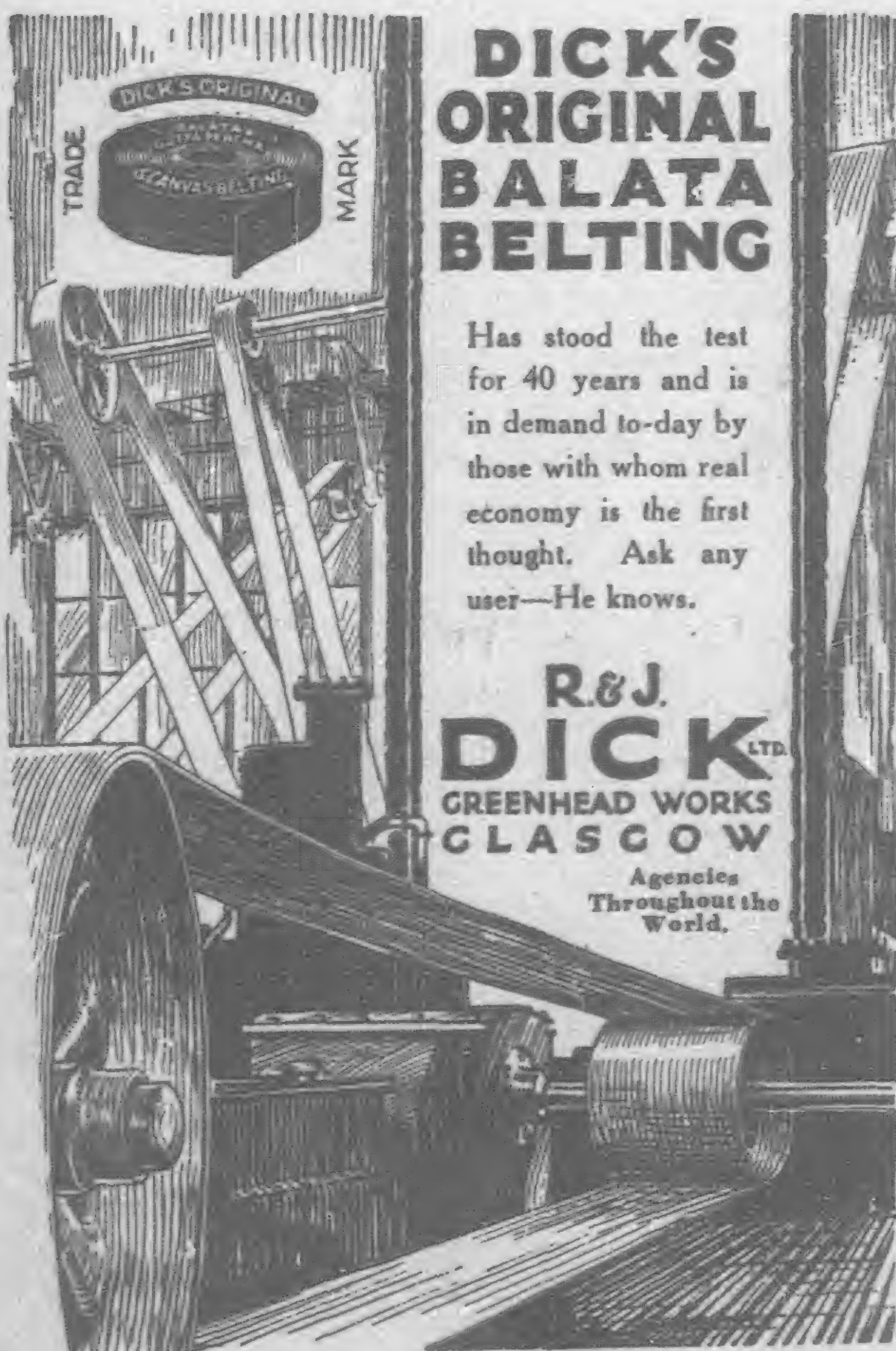
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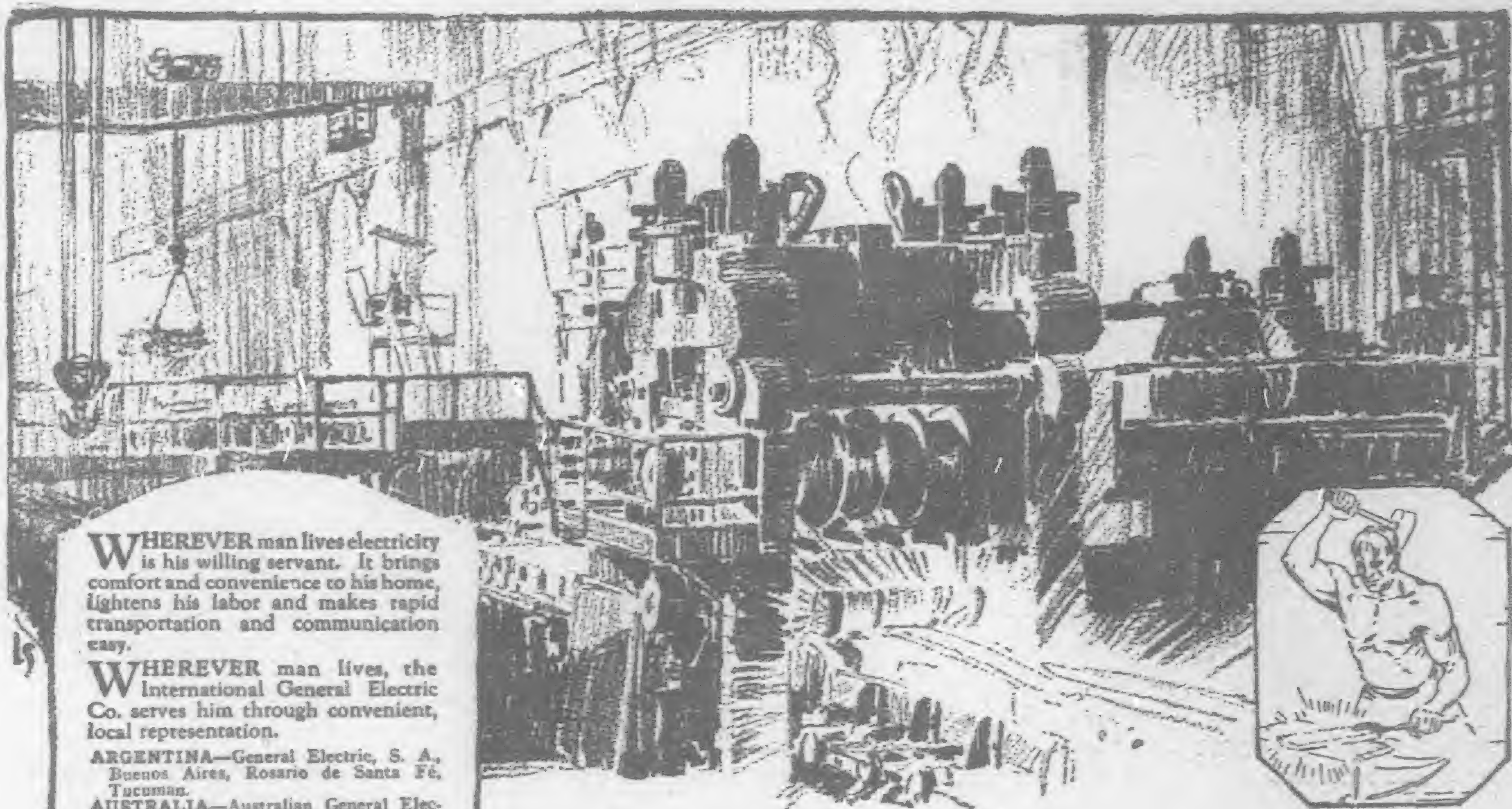
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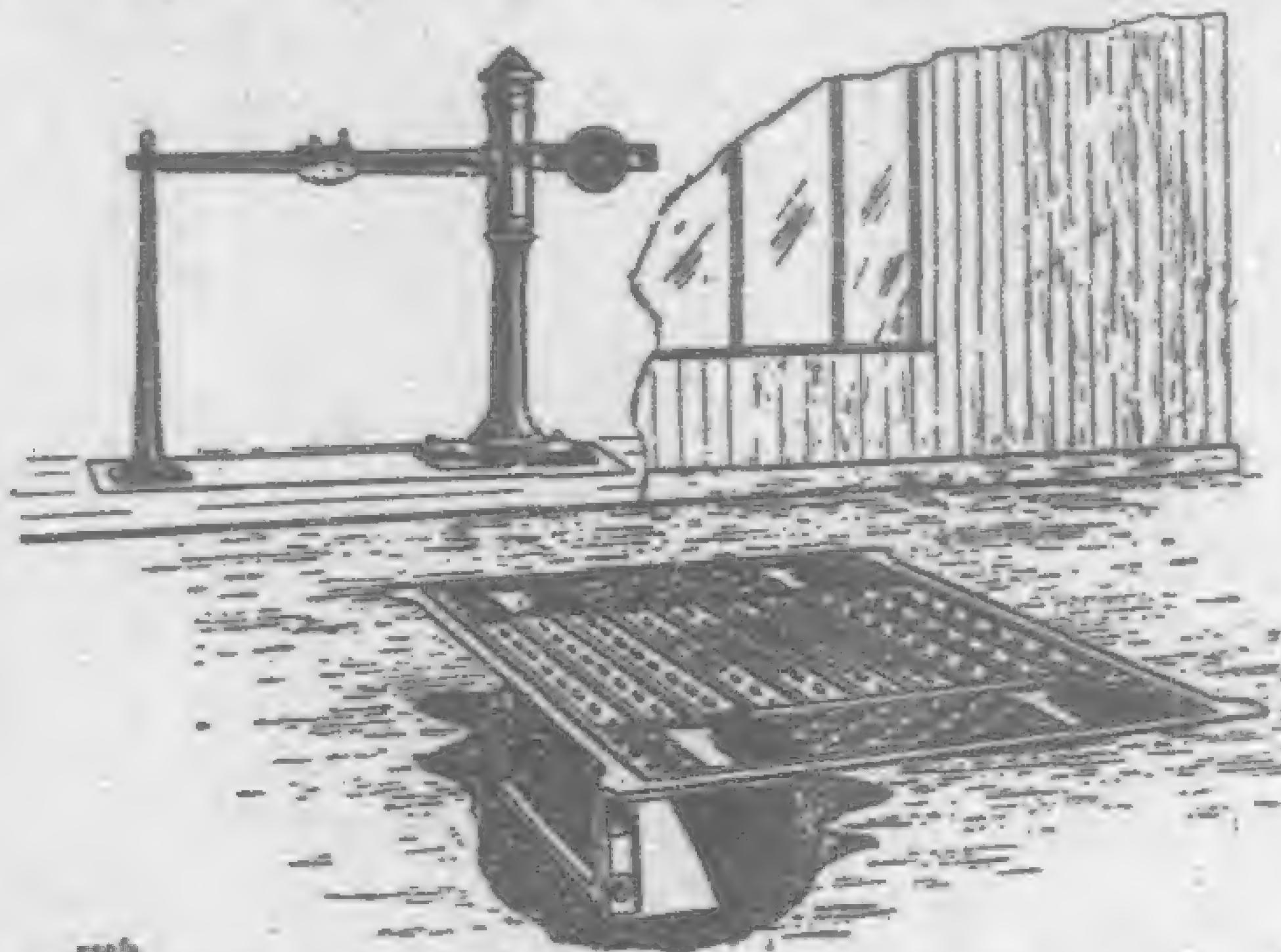
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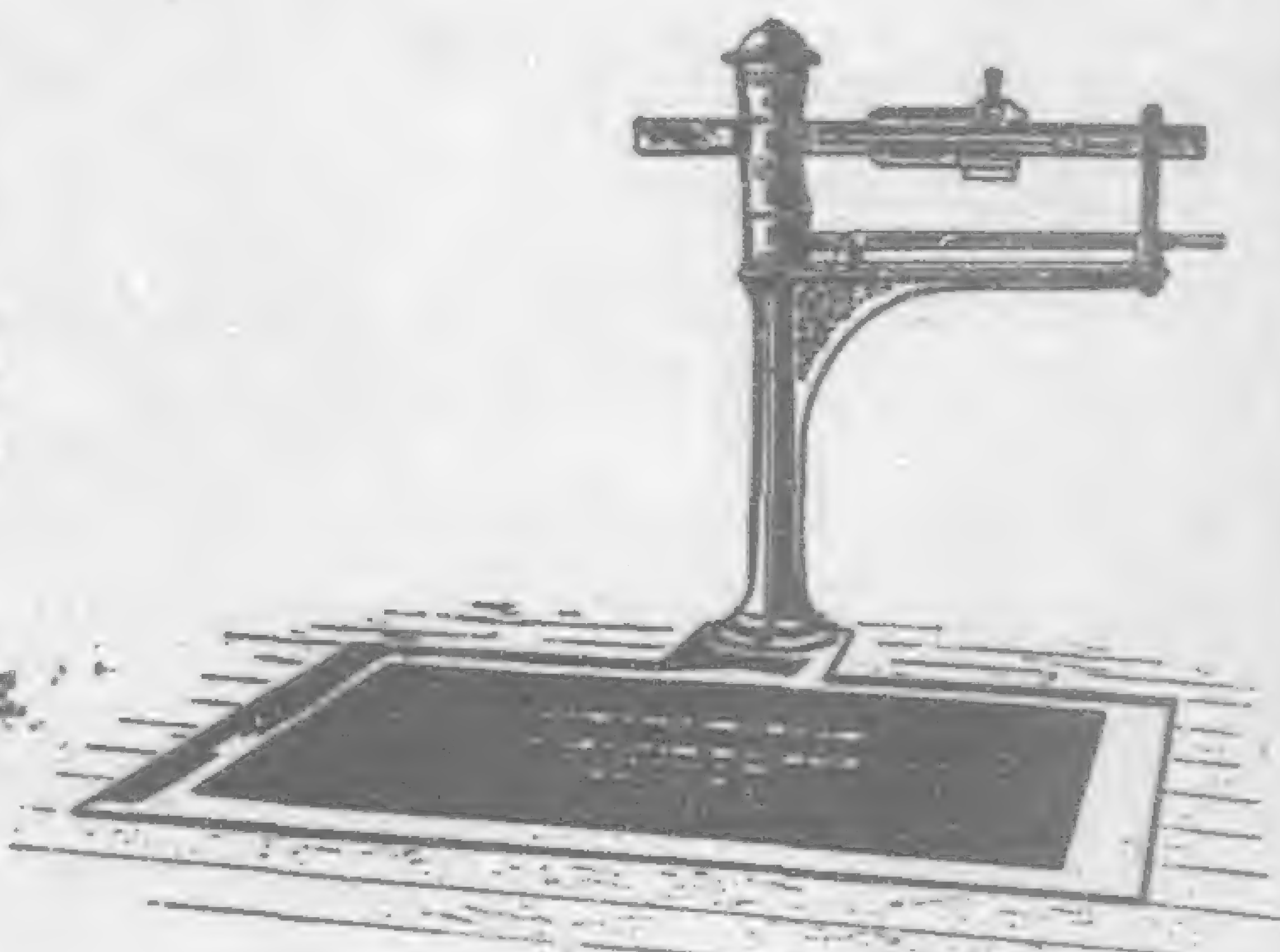
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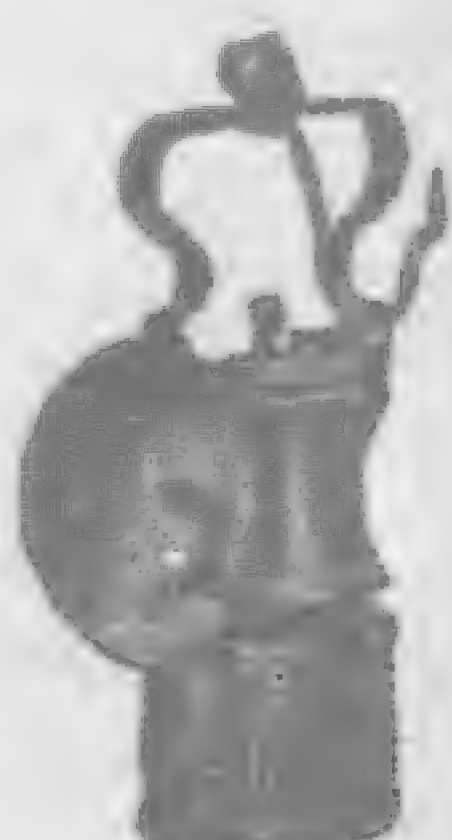
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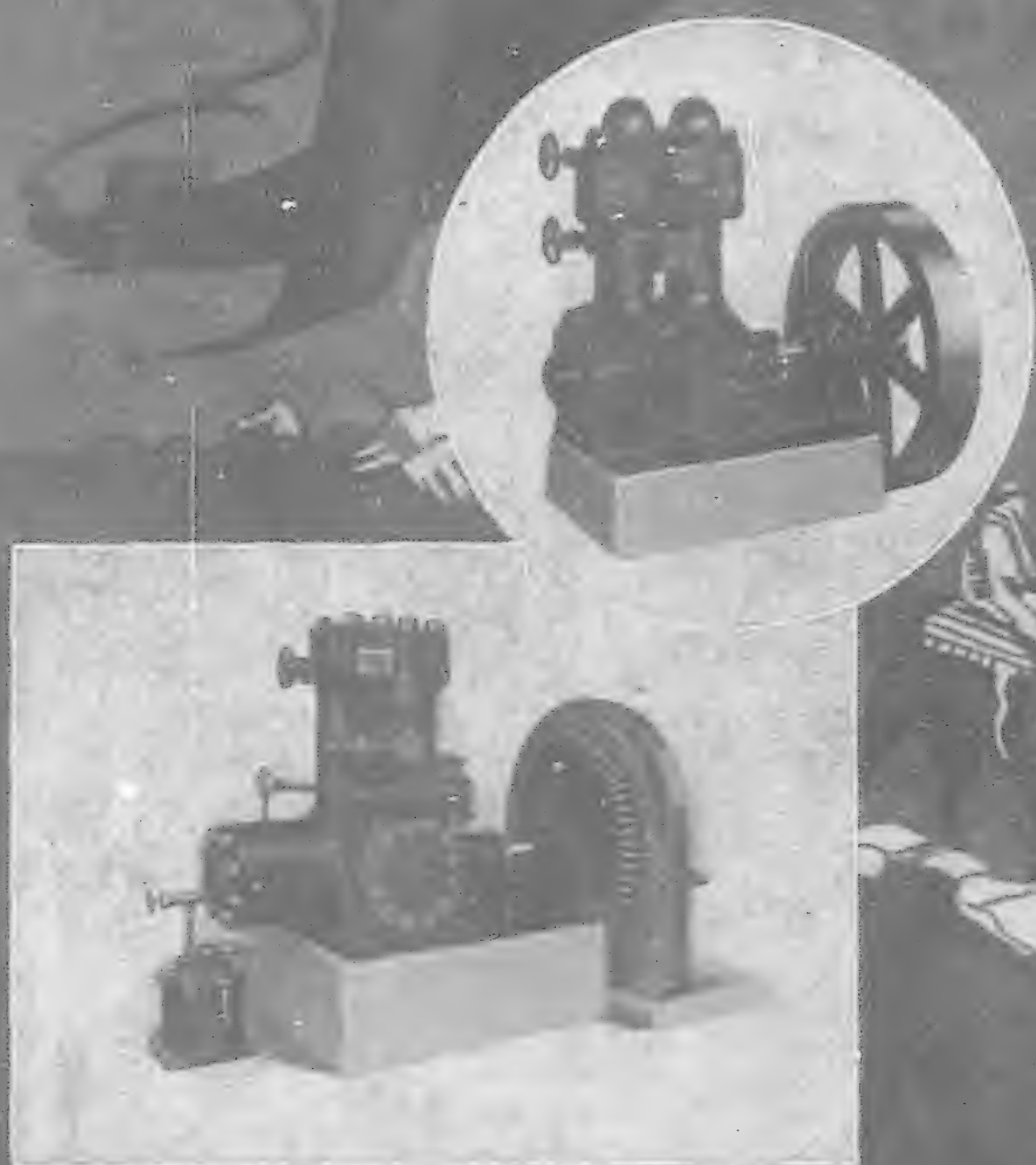
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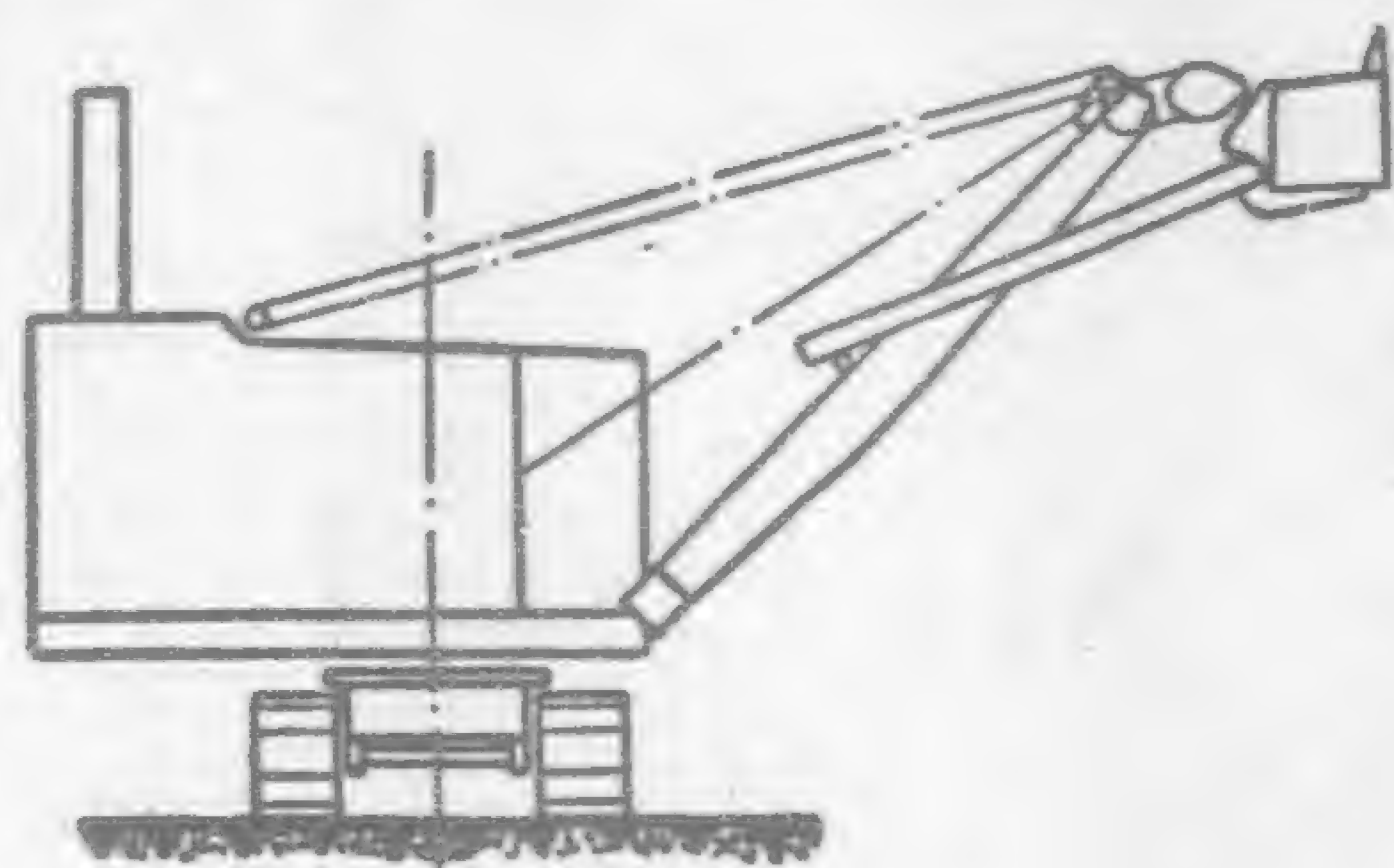
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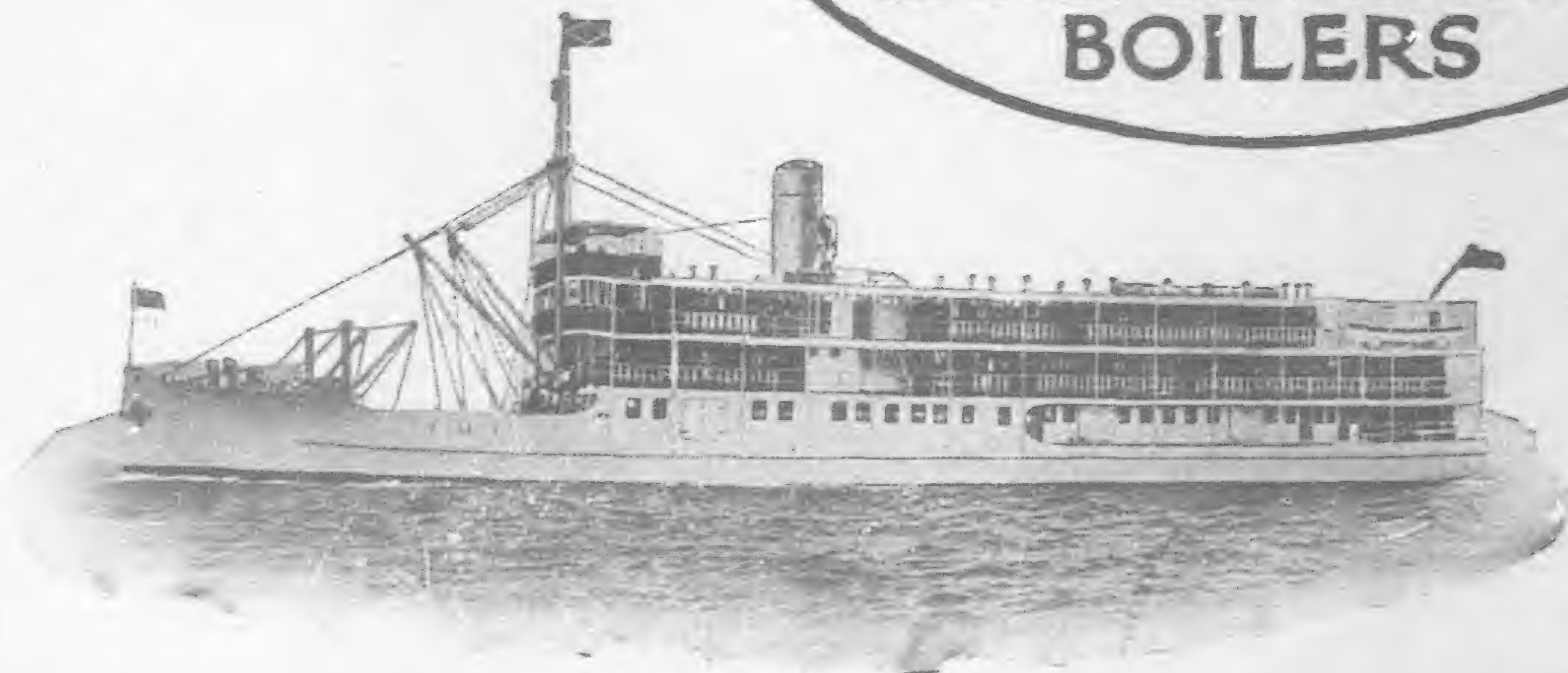
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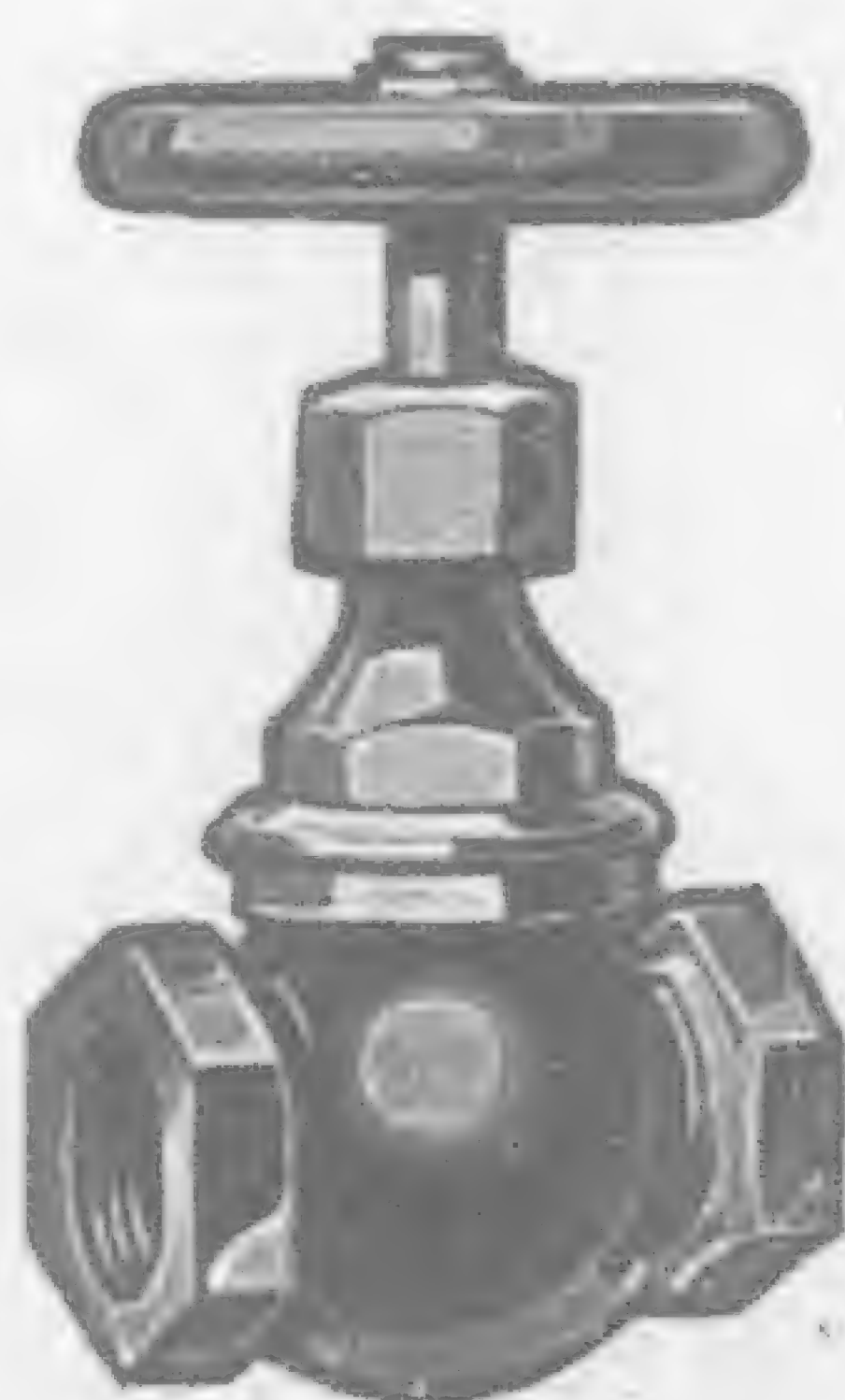
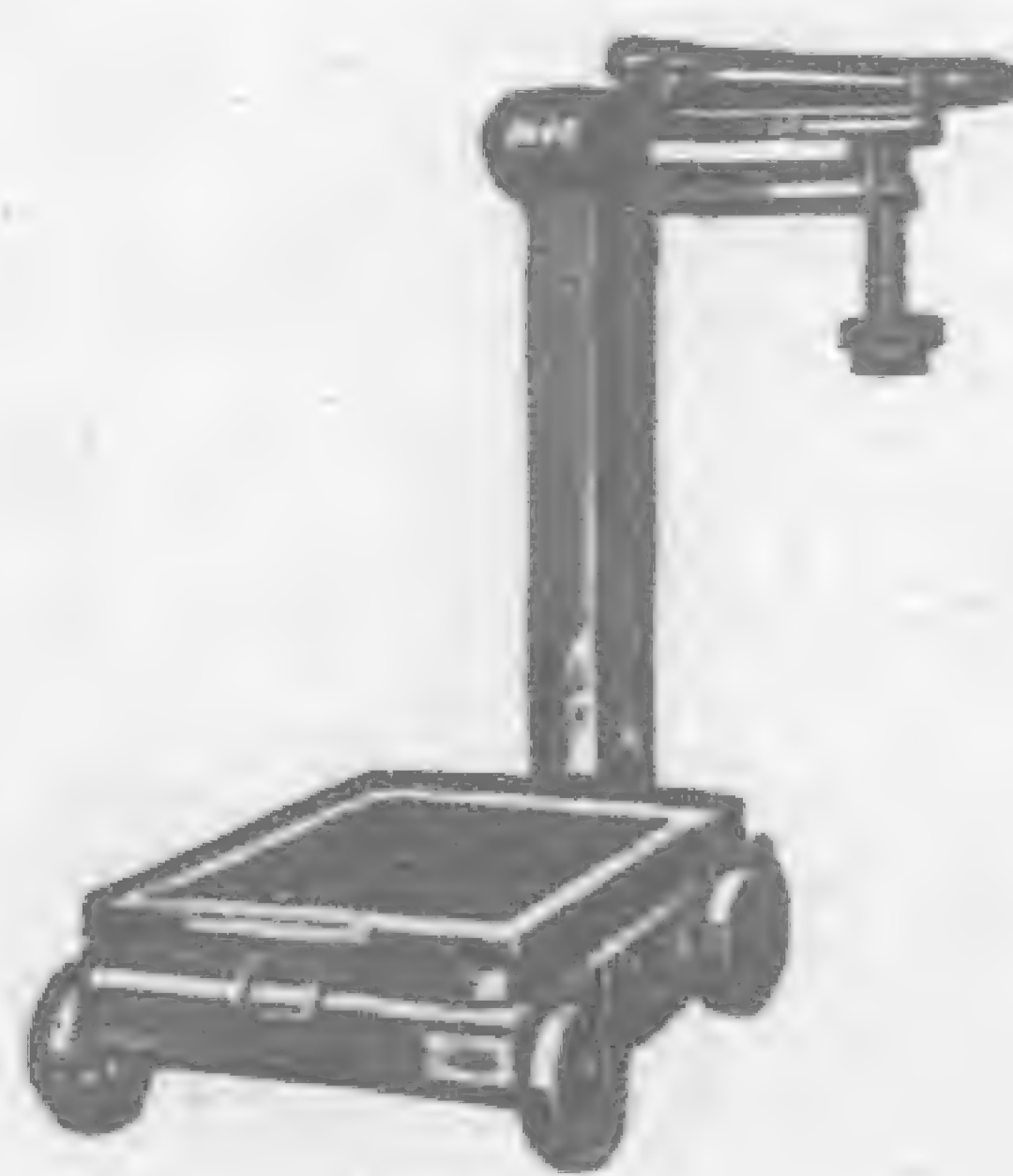
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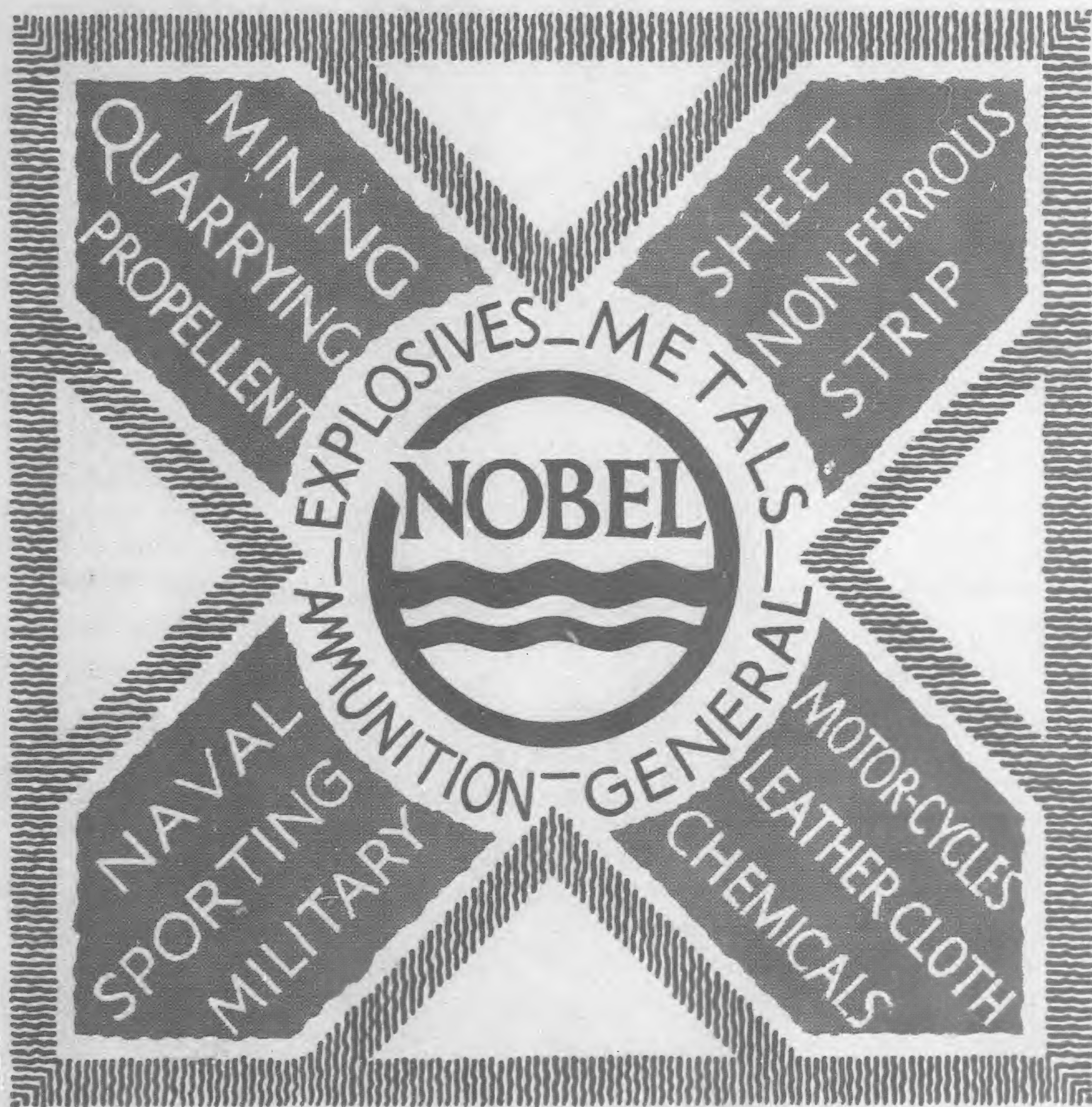
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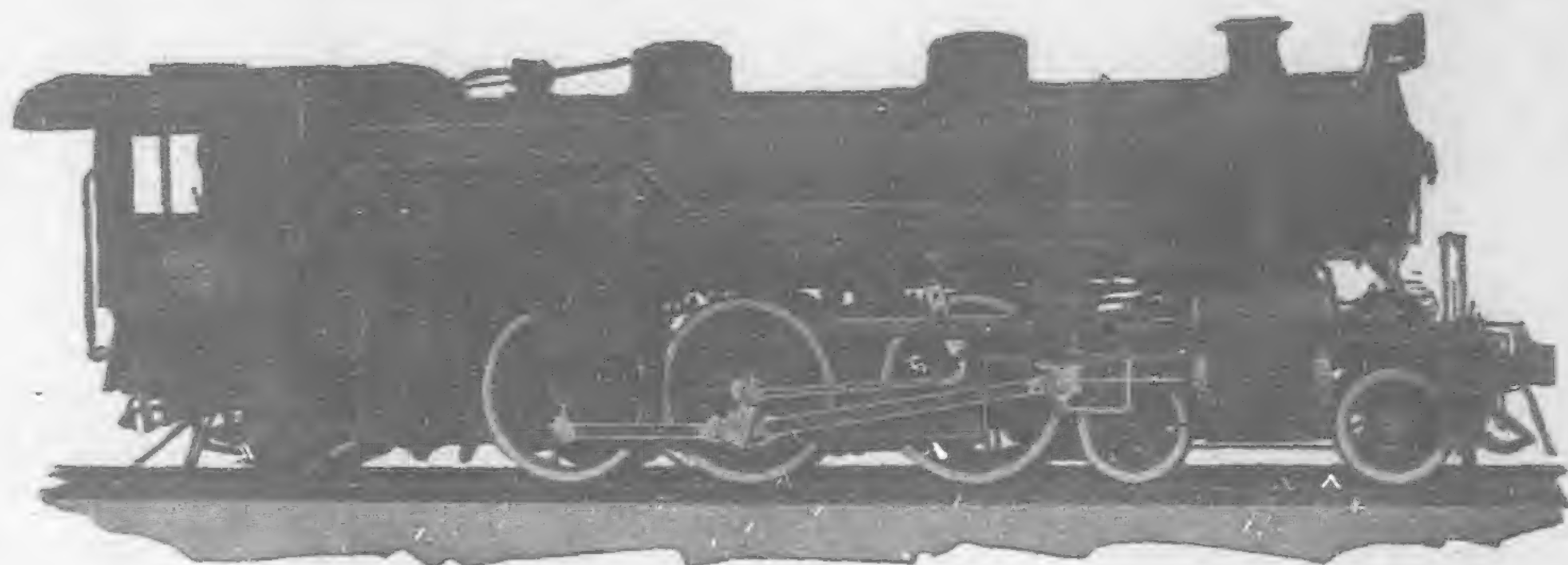
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Translation of an article which appeared in the "Tokyo Nichi-Nichi Shimbun"
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The Government Railways have completed operating tests of their 1,200 type 3-cylinder locomotives on the Tokaido line between Tokyo and Maibara, extending from May 12th to May 21st. The engine pulled the regular third class limited express train and four extra cars added thereto, with good results, assuring an increase of limited express accommodation and very comfortable riding for 300 more passengers. Mr. Fukui, engineer in charge of the test says, "This locomotive was built by the American Locomotive Company, and because of the three cylinder feature it causes less than half the vibration to the train as compared with ordinary present day locomotives—it gives a fine smooth start and prevents disagreeable shocks to the passengers. It pulls the regular limited express with four additional cars and still has plenty of power left to haul more. From now on this type will be the motive power for all limited express trains. Imagine pulling 17 cars and keeping the limited express speed; it surely revolutionizes the locomotive world."

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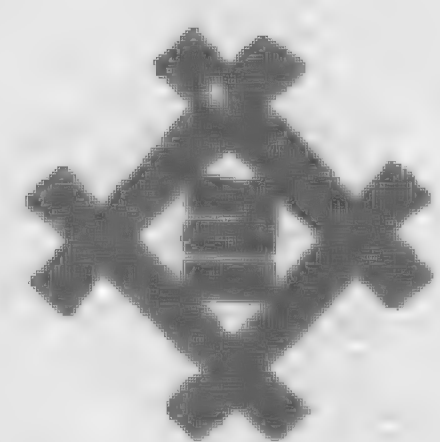
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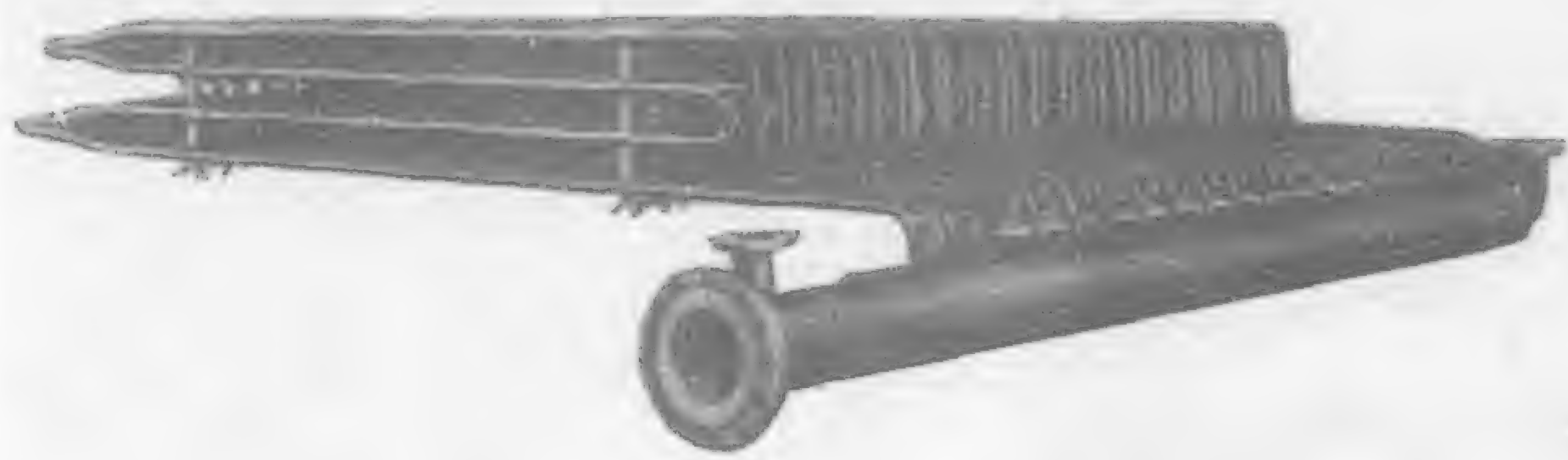
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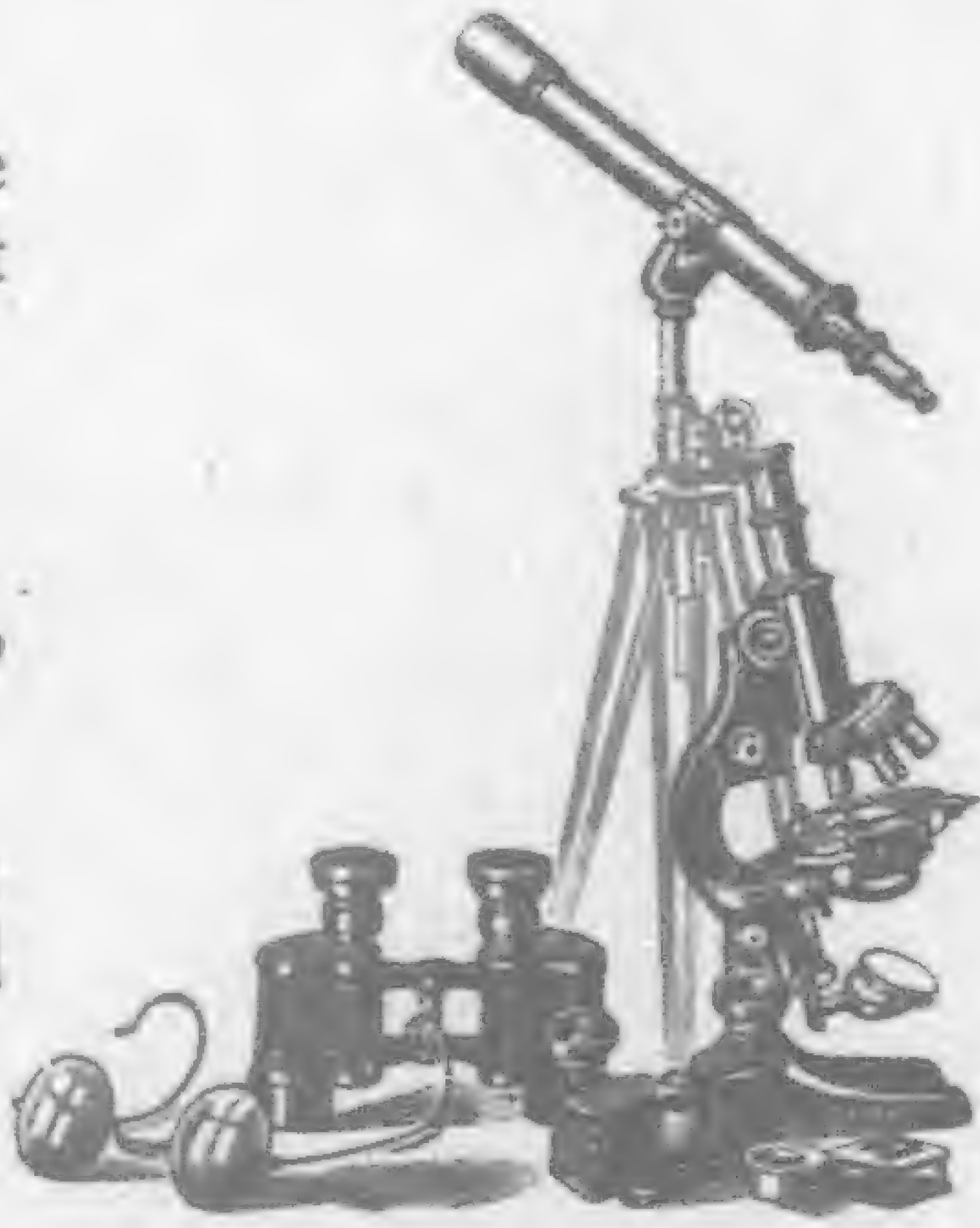
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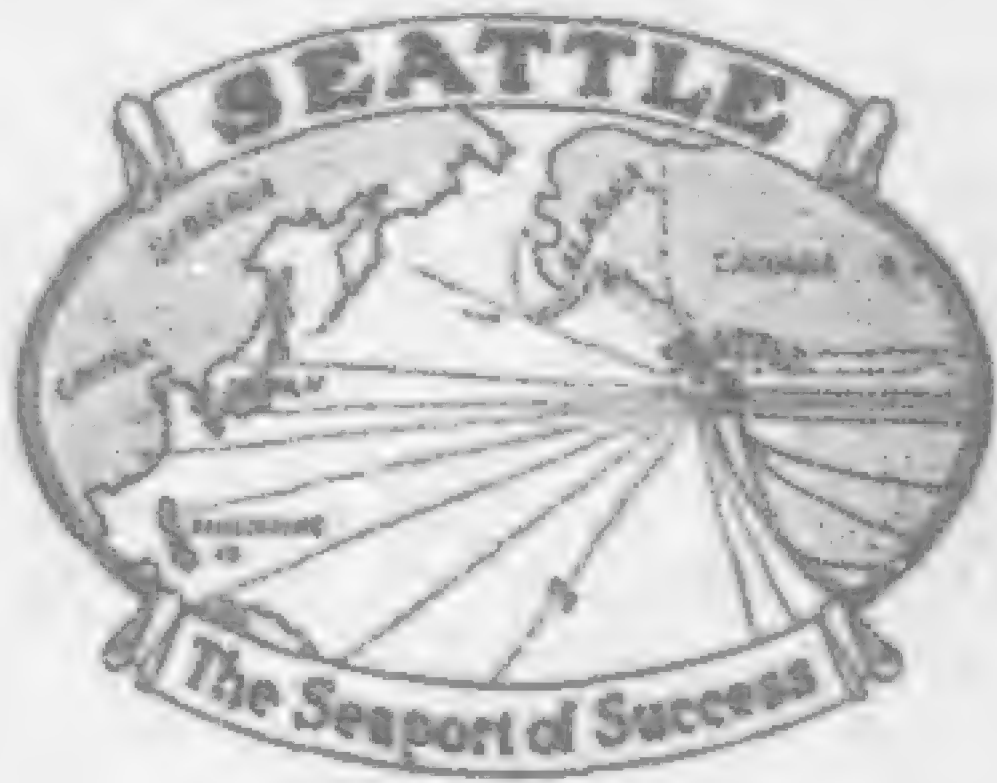
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But at last the idea of hydro-electricity was born. The world's rivers assumed a new

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The Daido organization, with its six enormous power units on the Kiso River (in the Japanese Alps) has pointed the way for all future hydro-electric development in this country. Its plants are the most extensive and its power capacity the greatest in the Eastern Hemisphere. And by all who know industrial conditions in Japan, it is recognized not only as a modern and efficient business organization, but a guiding star for the forward movement of industrial organizations in the East.

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Water Power Generated by Daido

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Kisogawa Shizumo Power Station...	14,700
" Yomigaki " " ...	40,700
" Oi " " ...	42,900
" Okuwa " " ...	11,000
" Suhara " " ...	9,200
" Momoyama " " ...	23,100
Yahagigawa Kushihara Power Station ...	6,000
Kuzuryugawa Nishi Kadohara Power Station ...	7,200
Total (Kilowatt) ...	154,800

Steam Power Generated by Daido

	Kilowatt
Kema Power Station ...	12,500
Ajikawa East Power Station ...	18,000
Kasugade No. 1 Power Station ...	30,000
Kasugade No. 2 " " ...	40,000
Total (Kilowatt) ...	100,500

Power Received from Other Sources

	Kilowatt
Bisan Electric Power—Asahi Station.	1,300
Bisan Electric Power—Tokise Station	6,000
Kisogawa Denryoku—First and Second Station ...	2,700
Chuo Electric—Otani Station ...	6,000
Kamioka Water Power—Atotsugawa First Station ...	7,200
Total (Kilowatt) ...	23,200

CAPITAL AUTHORIZED, ¥112,963,000—TOTAL POWER GENERATING CAPACITY, 255,300 KILOWATT

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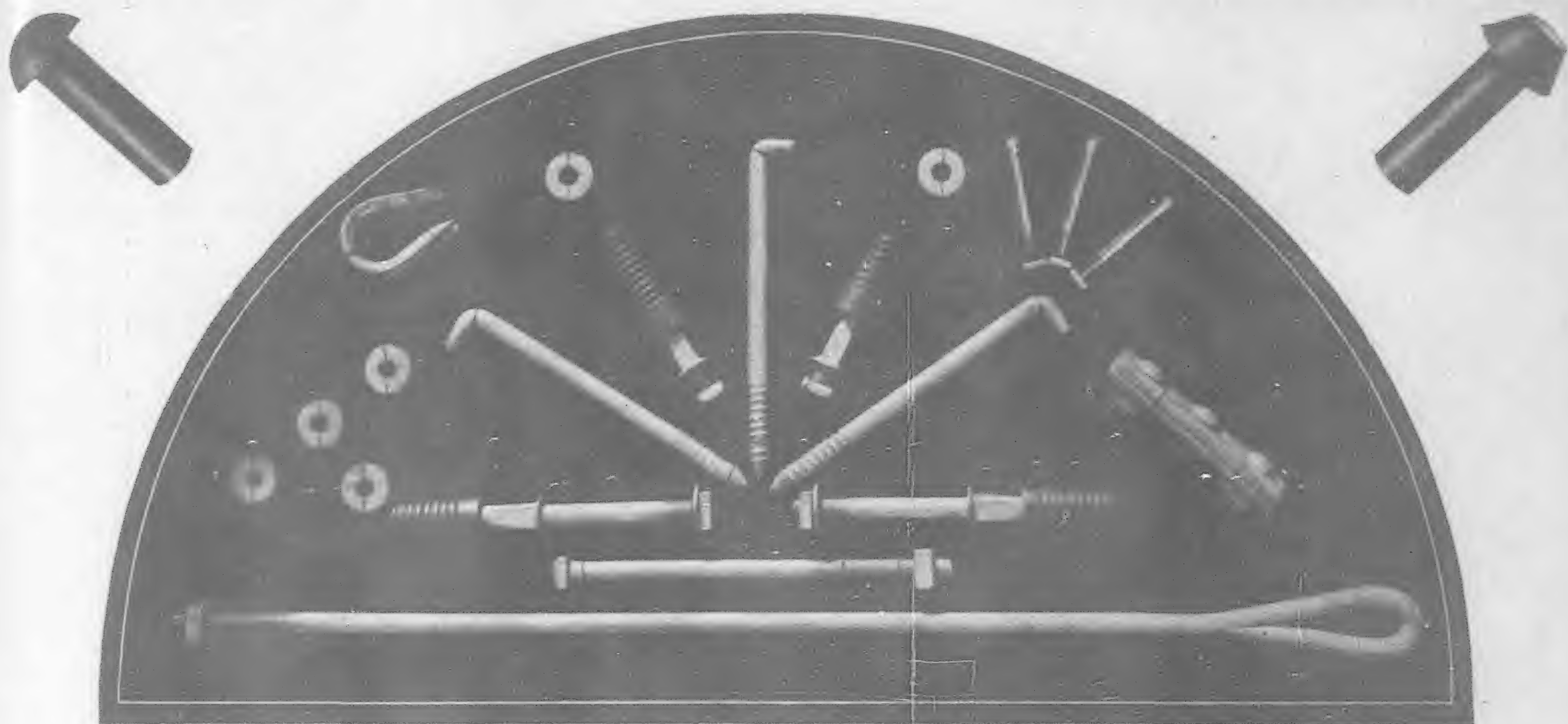
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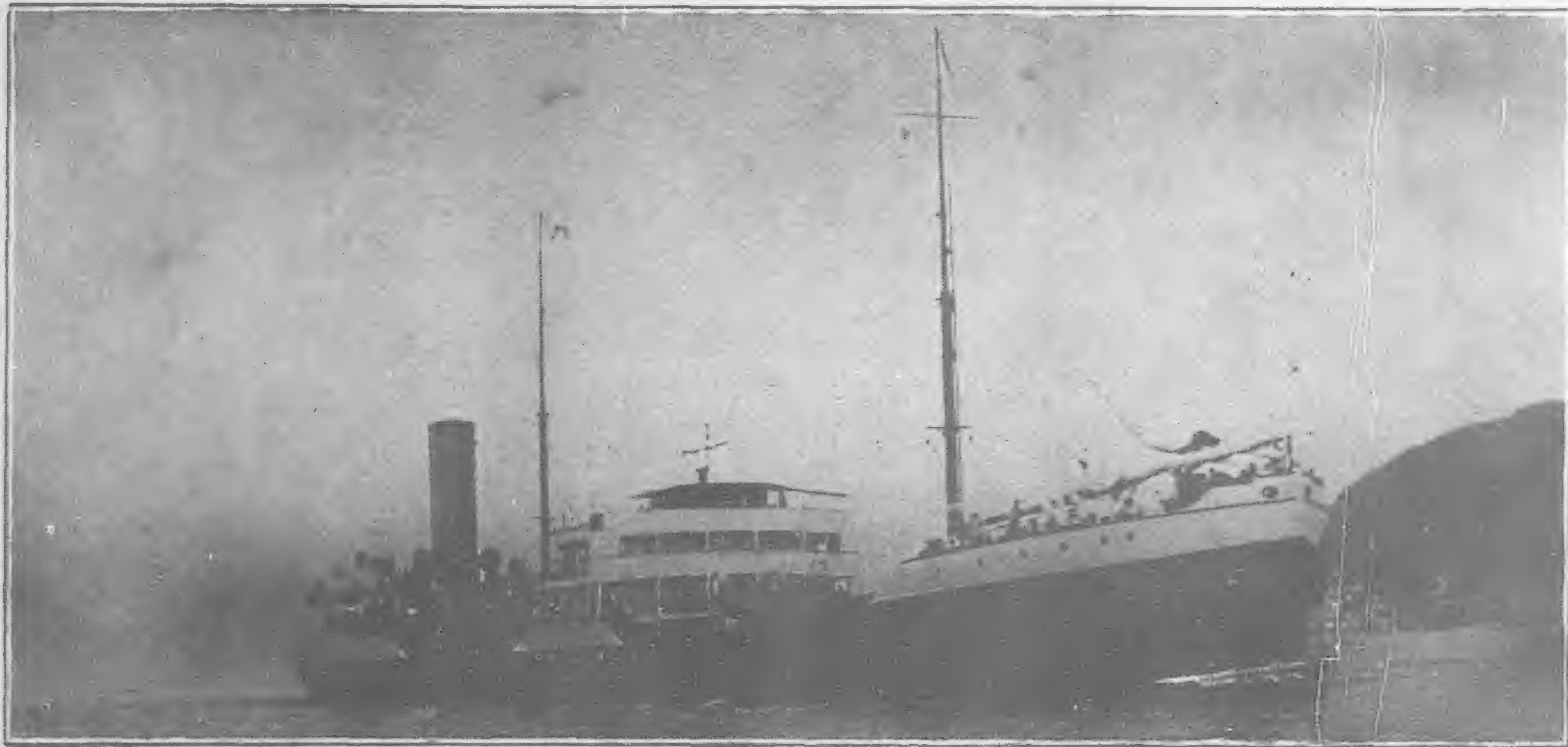
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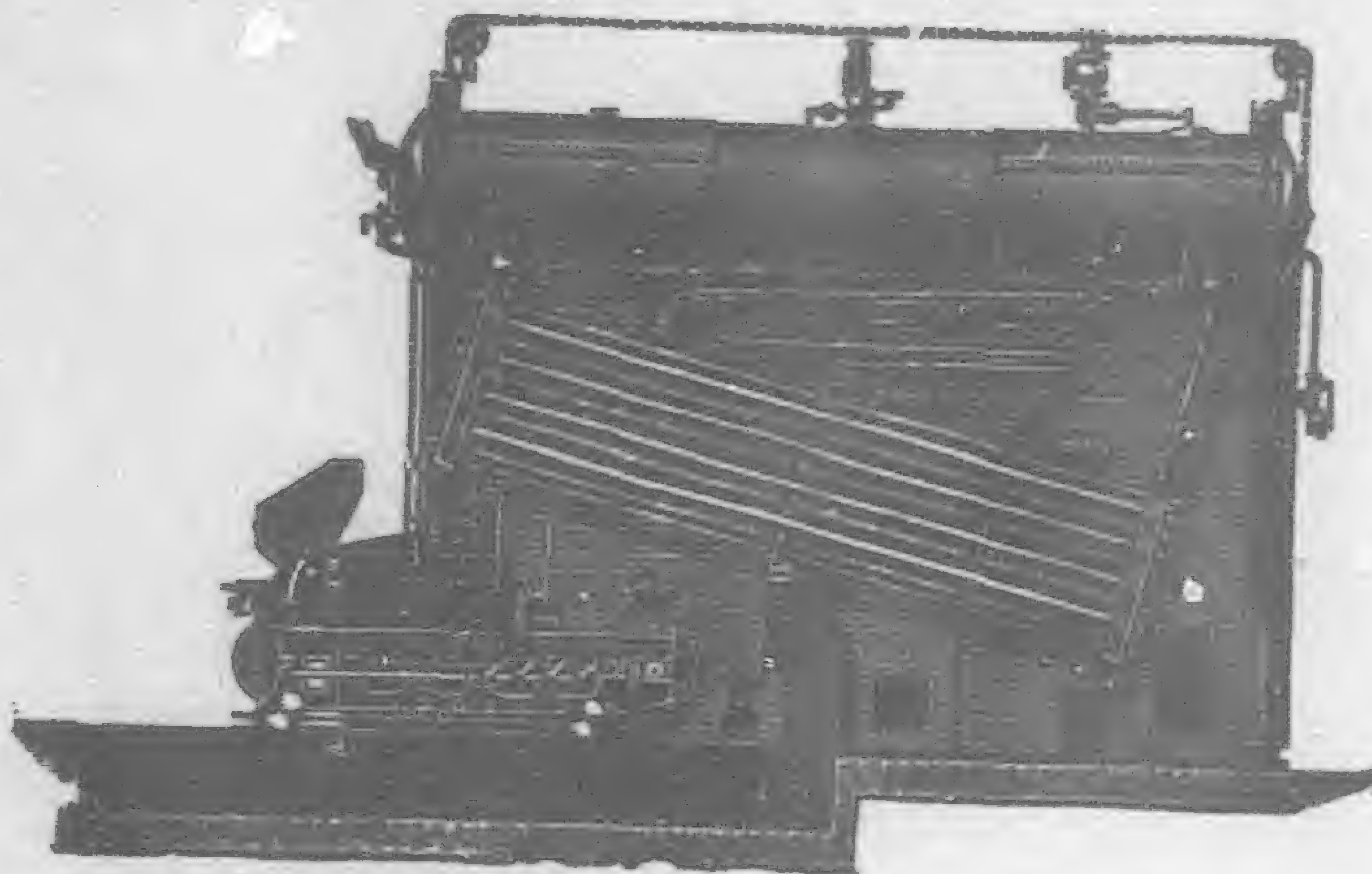
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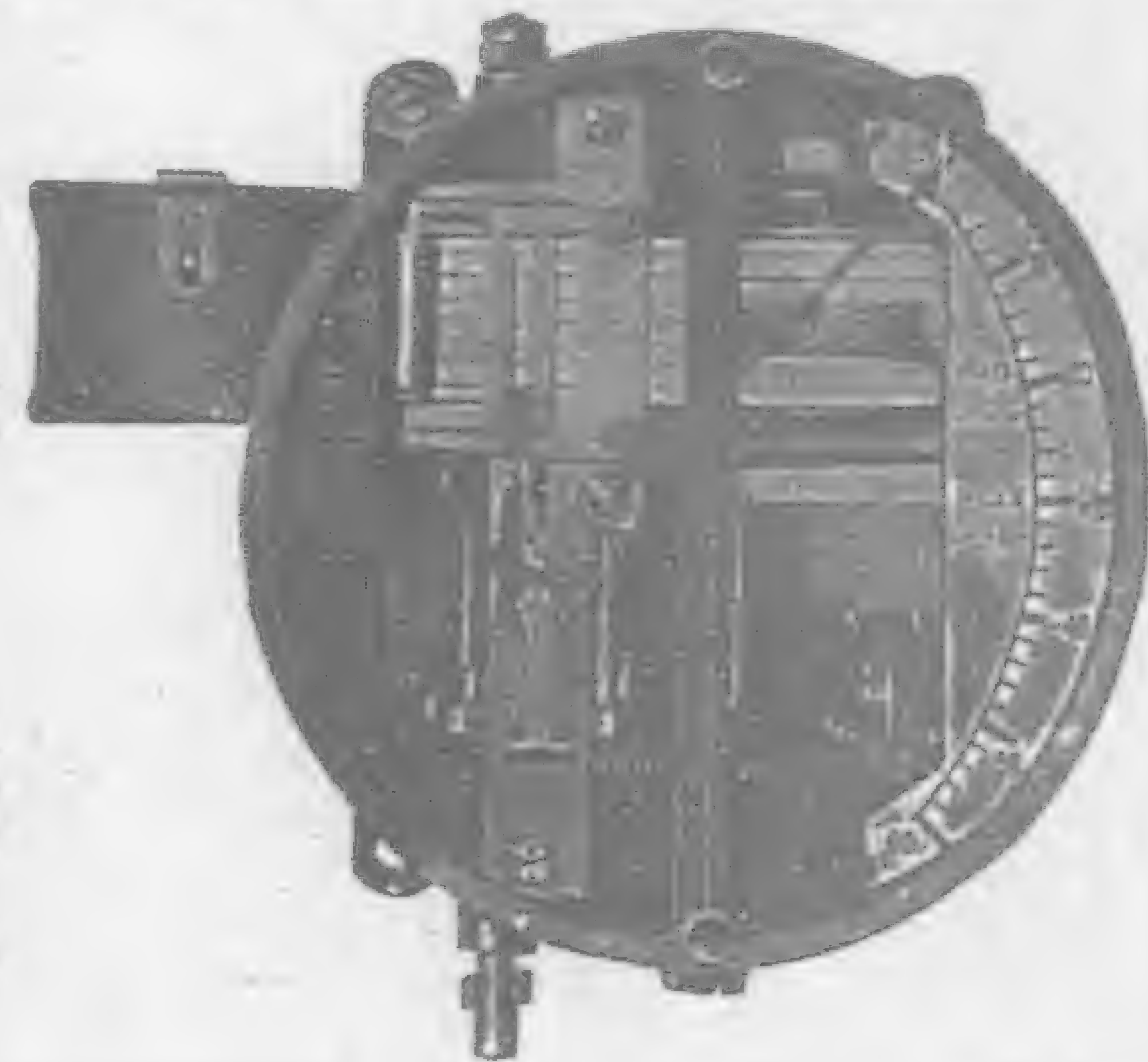
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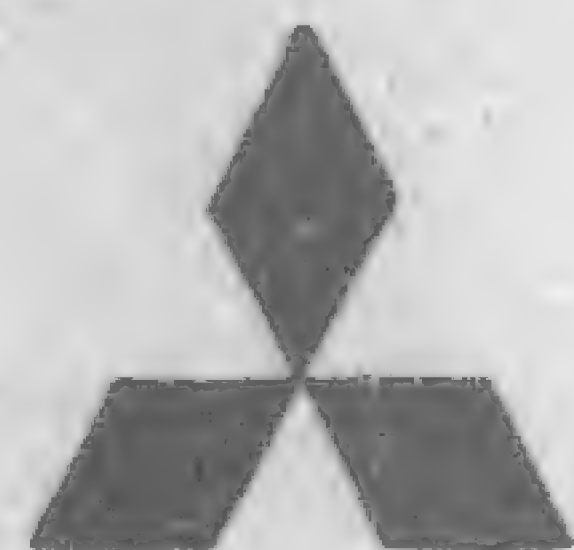
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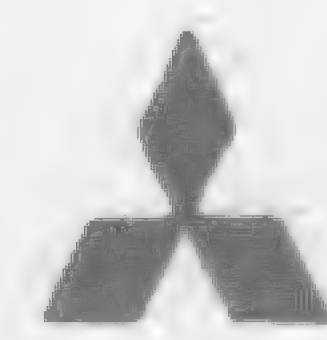
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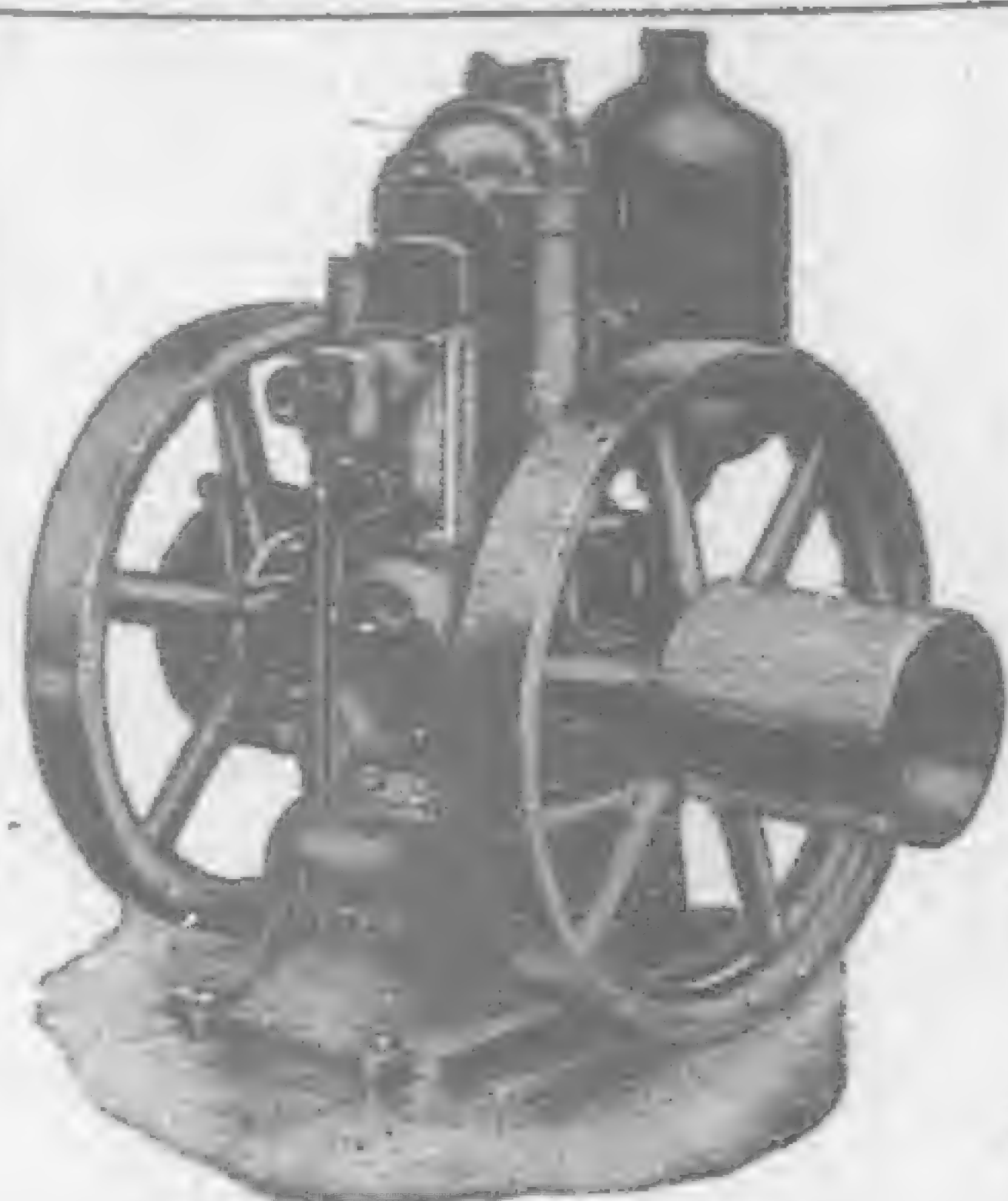
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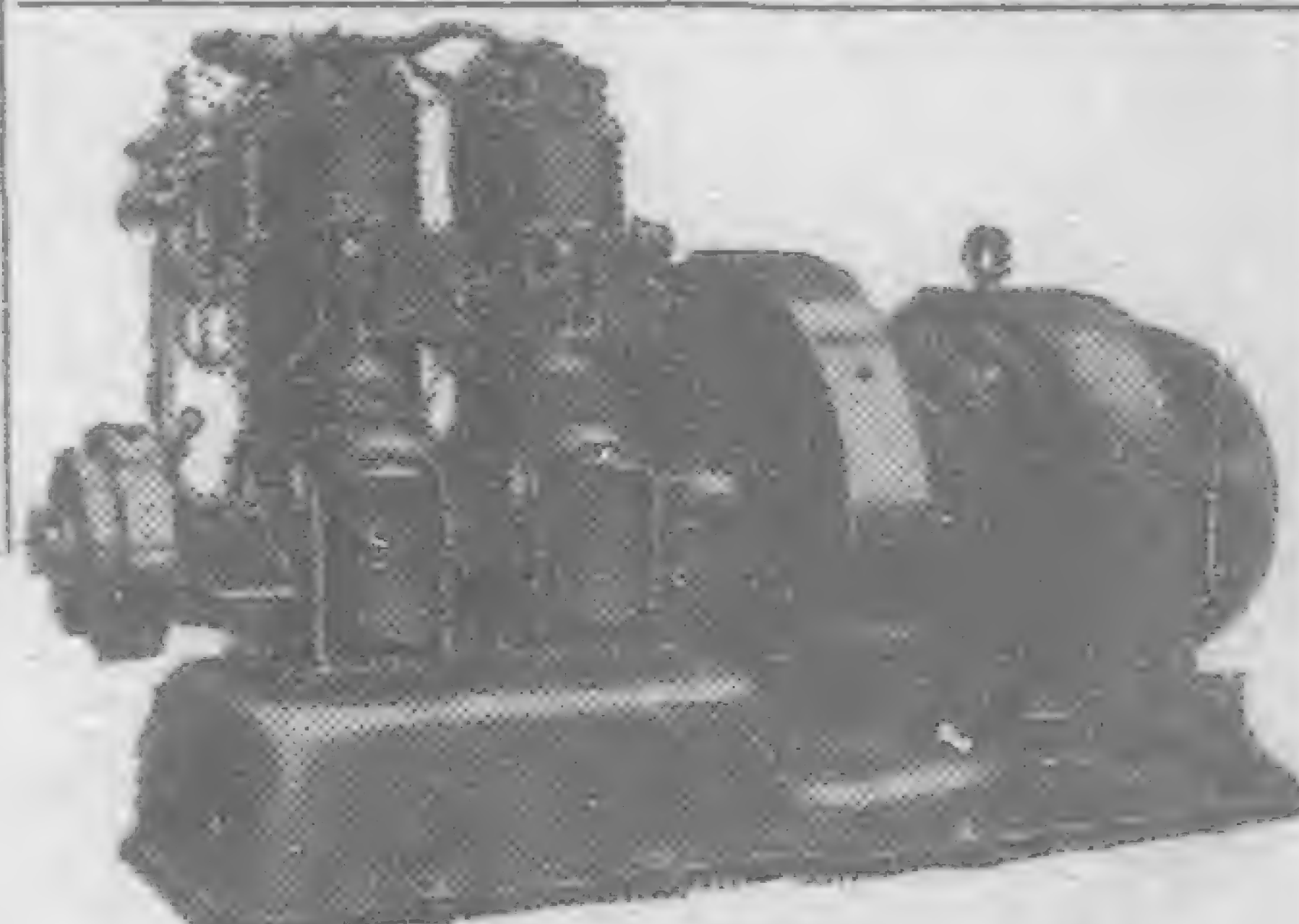
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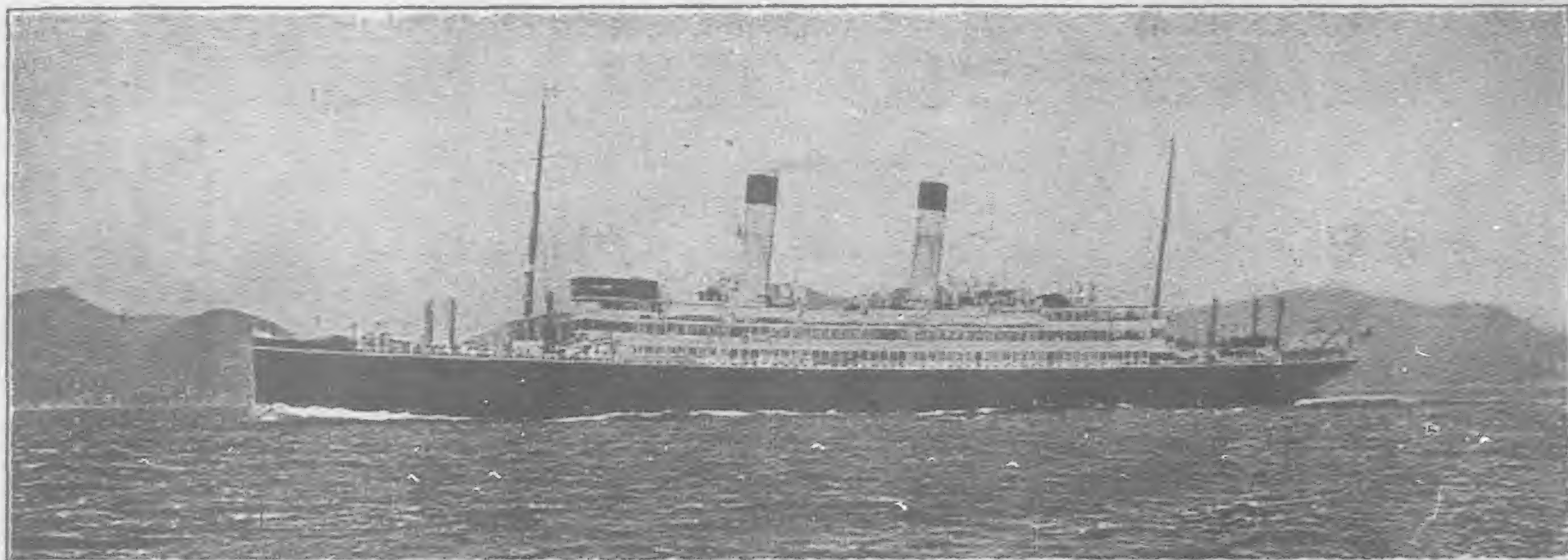
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Width of Entrance on Top	89 "	Width of Entrance on Top	66 "	Width of Entrance on Top	90 1/2 "
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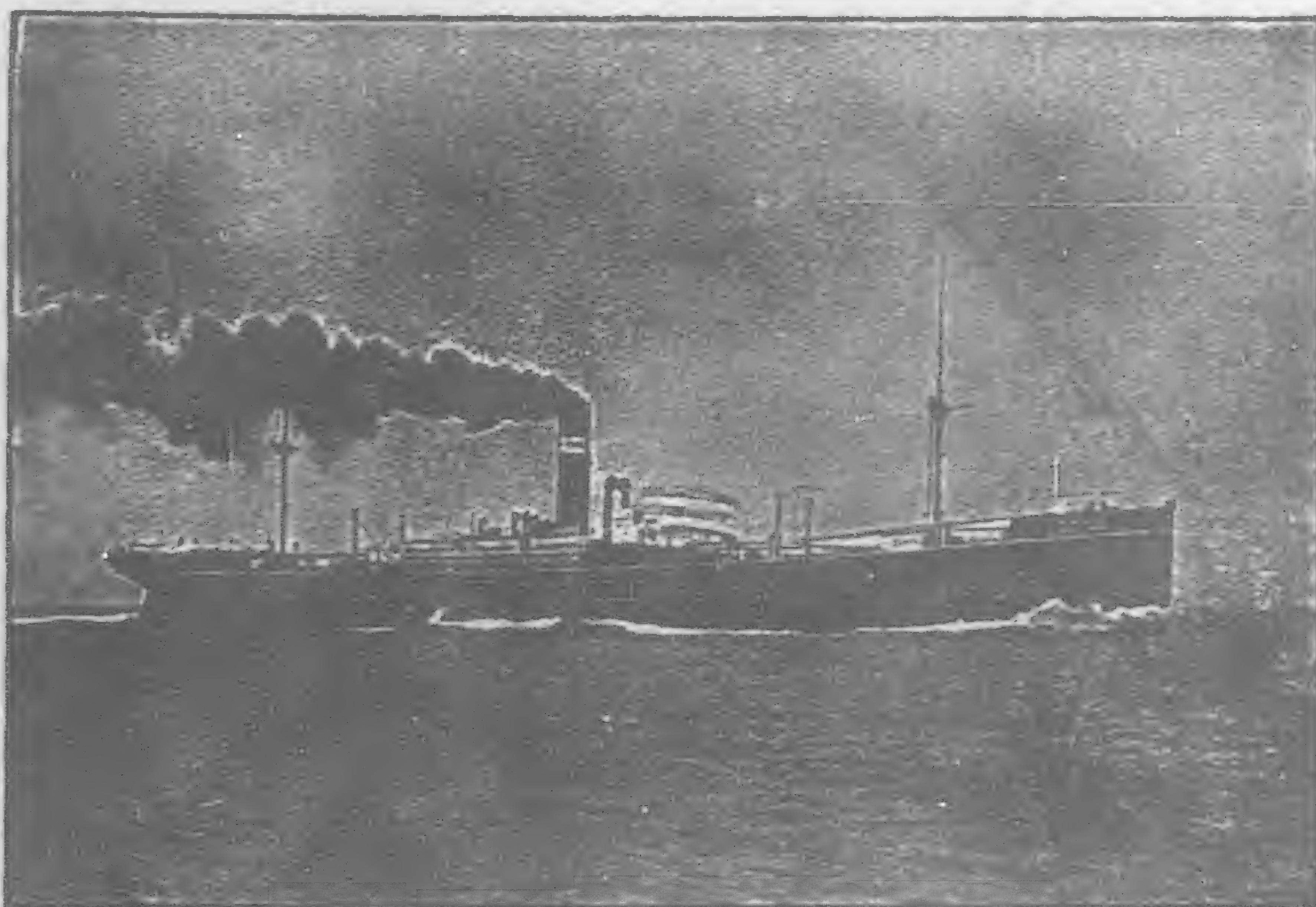
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YOKOHAMA—Dairen-Tientsin Line.—About 8 Sailings per month.

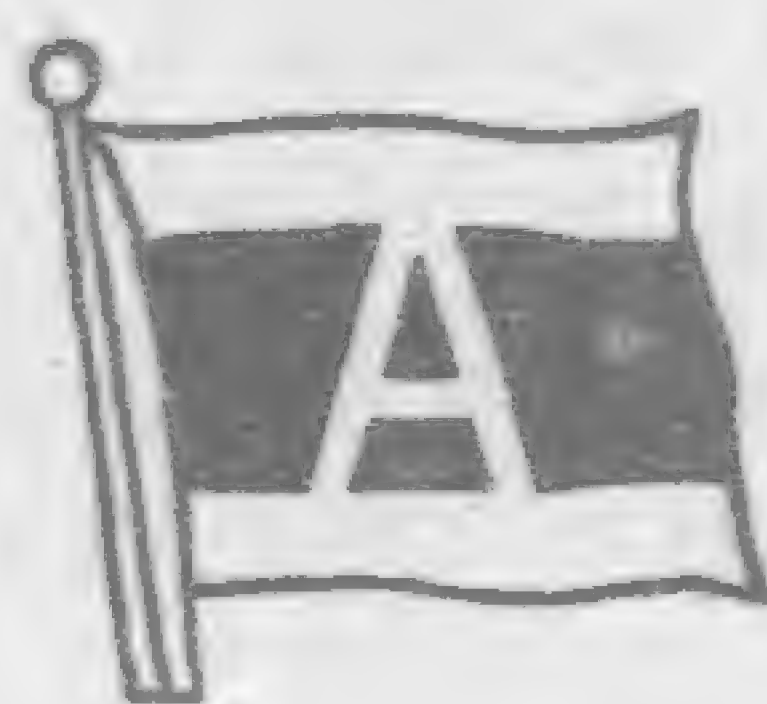
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Paid-up Capital	-	-	„ 87,500,000.00
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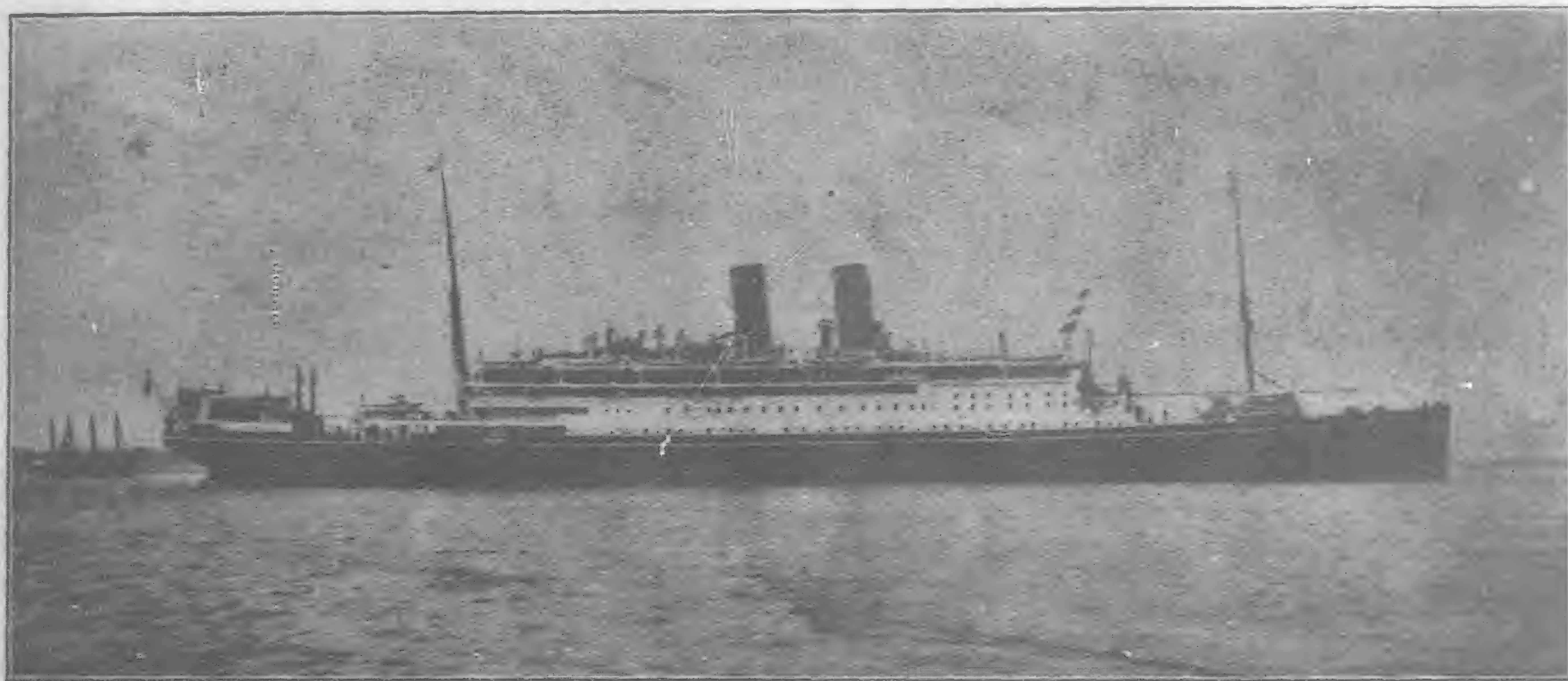
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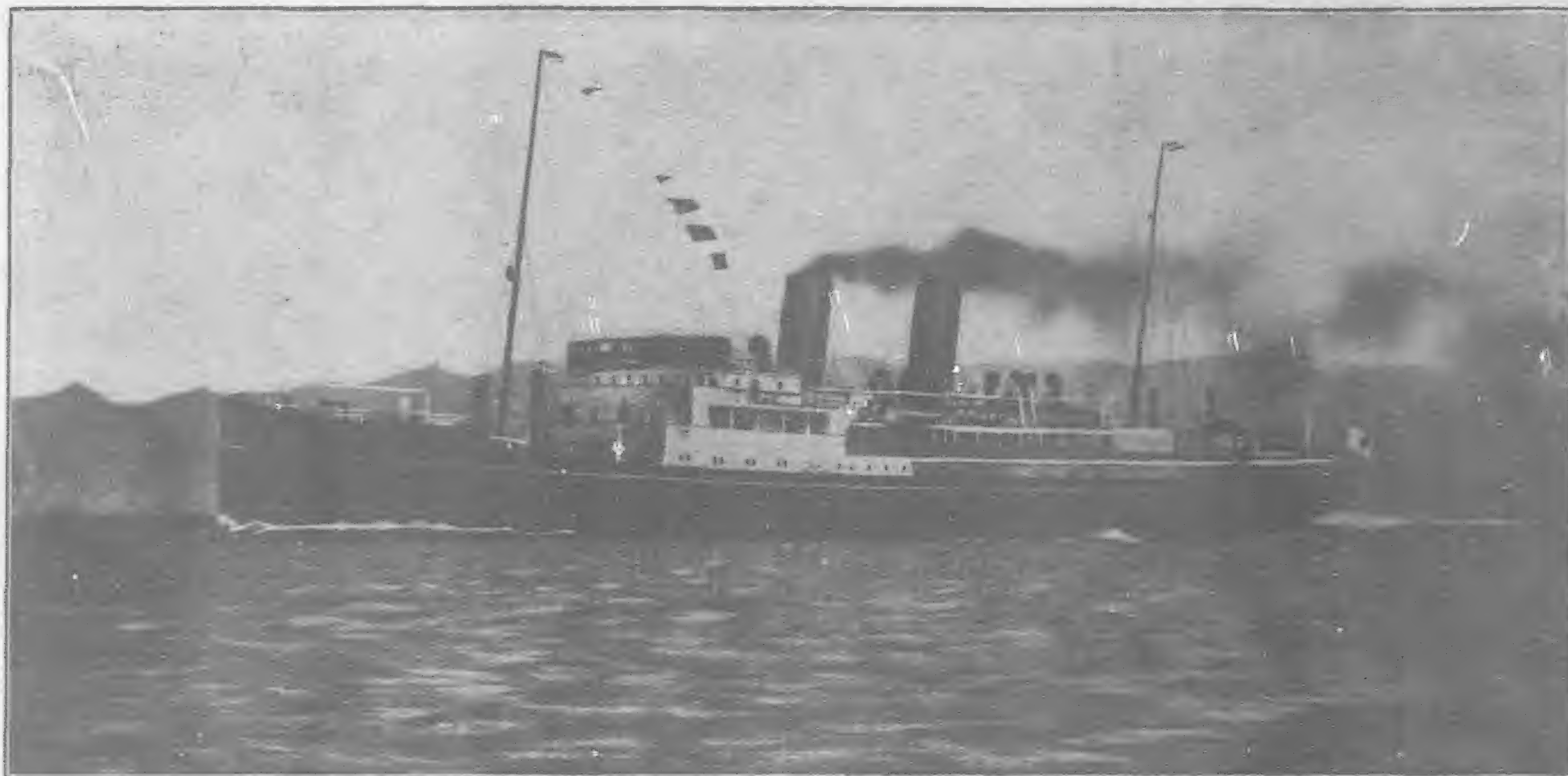
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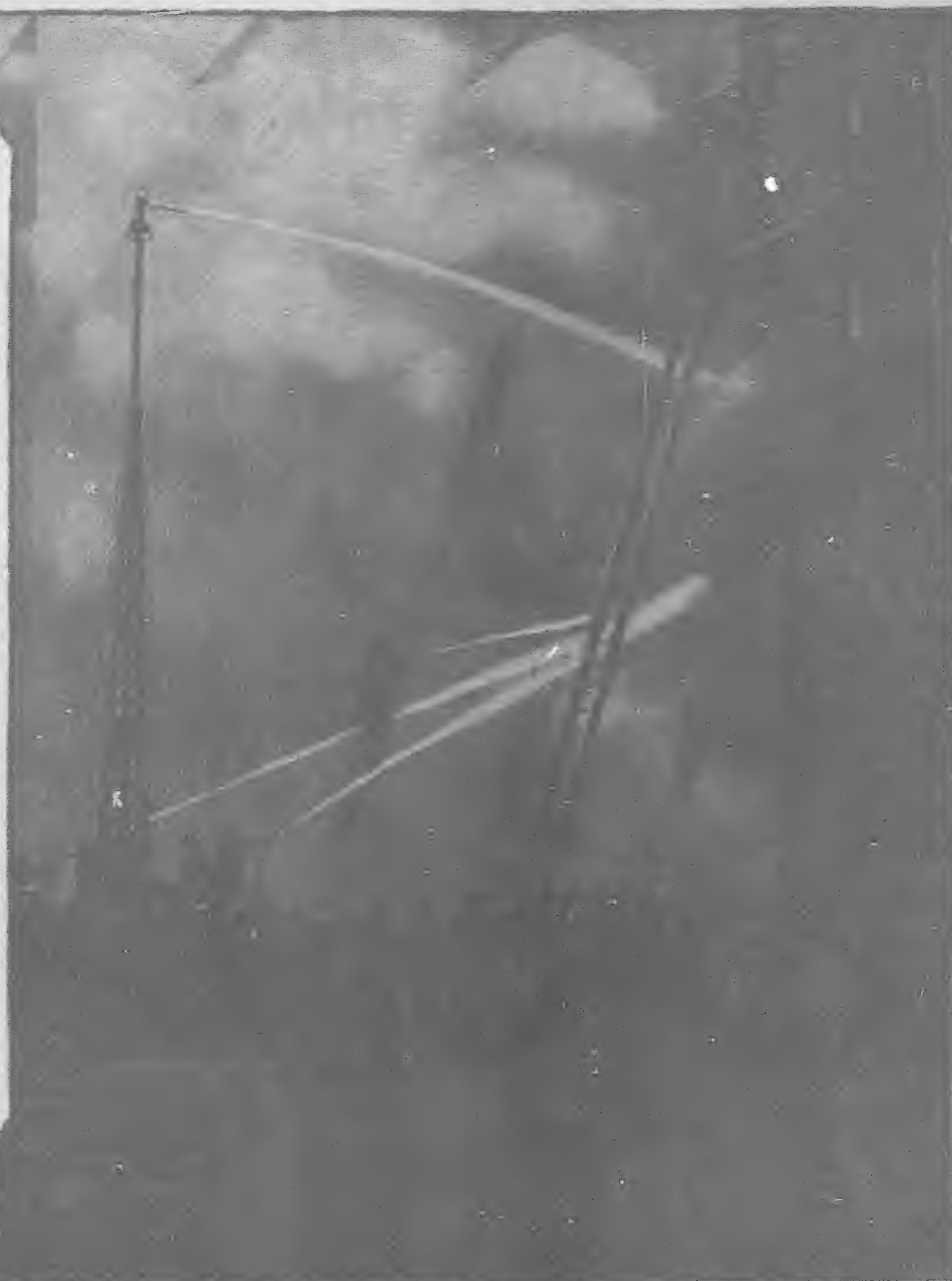
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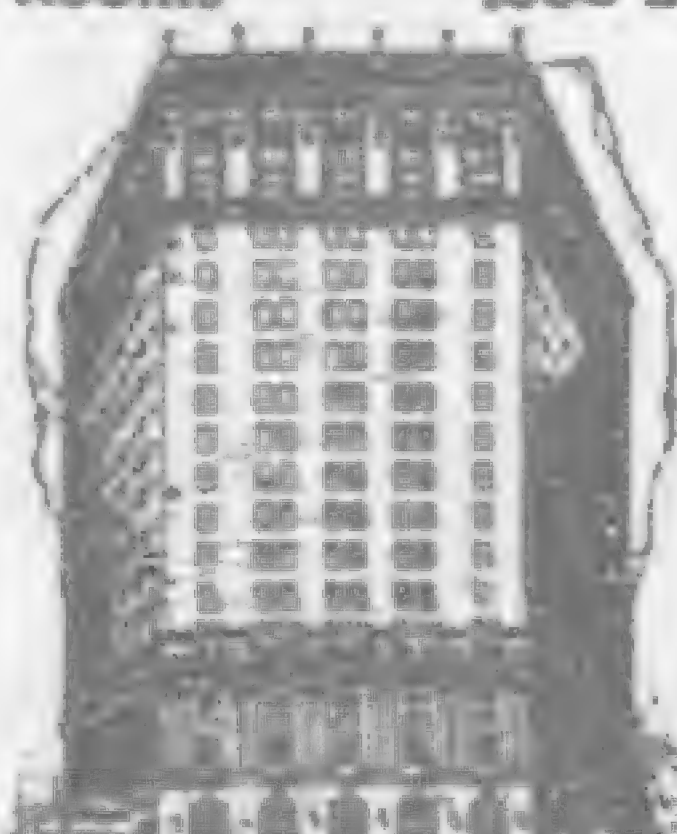
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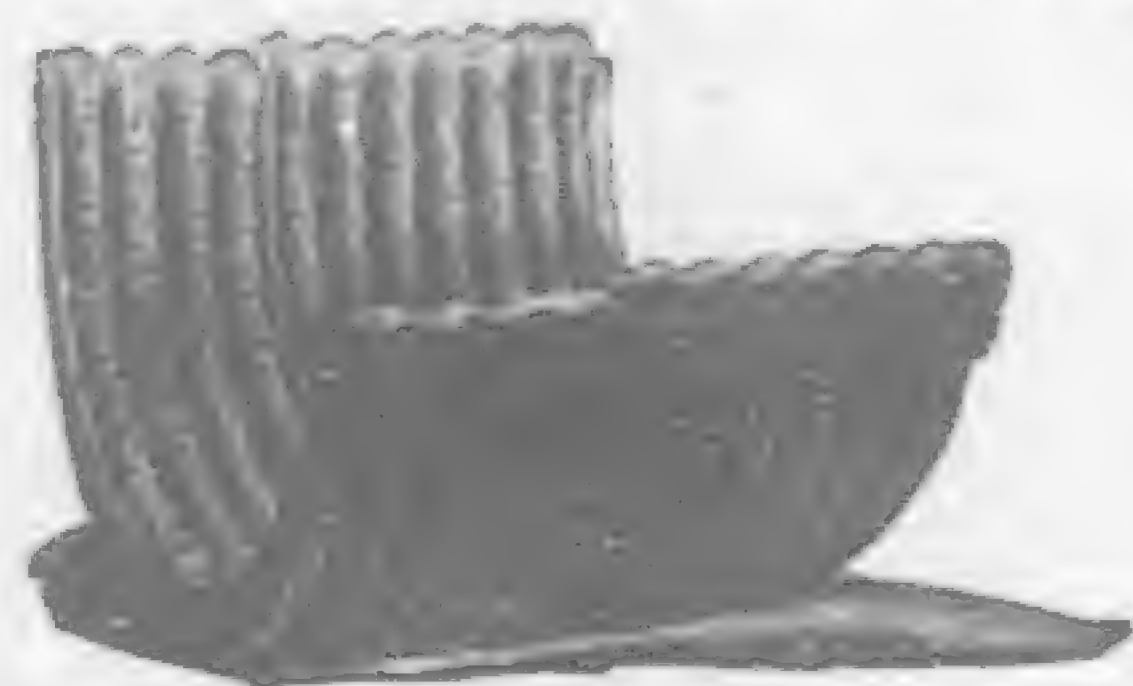
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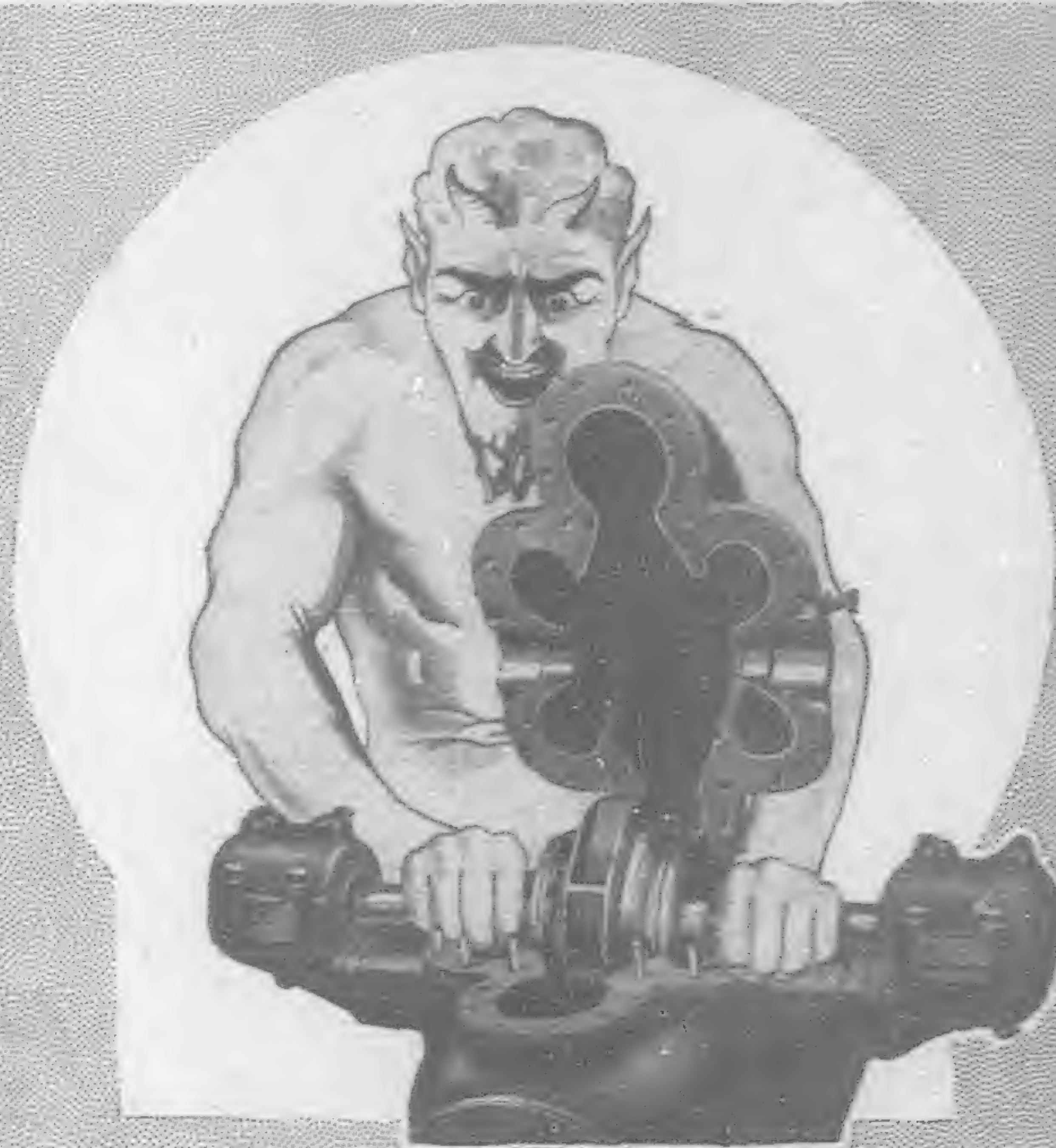
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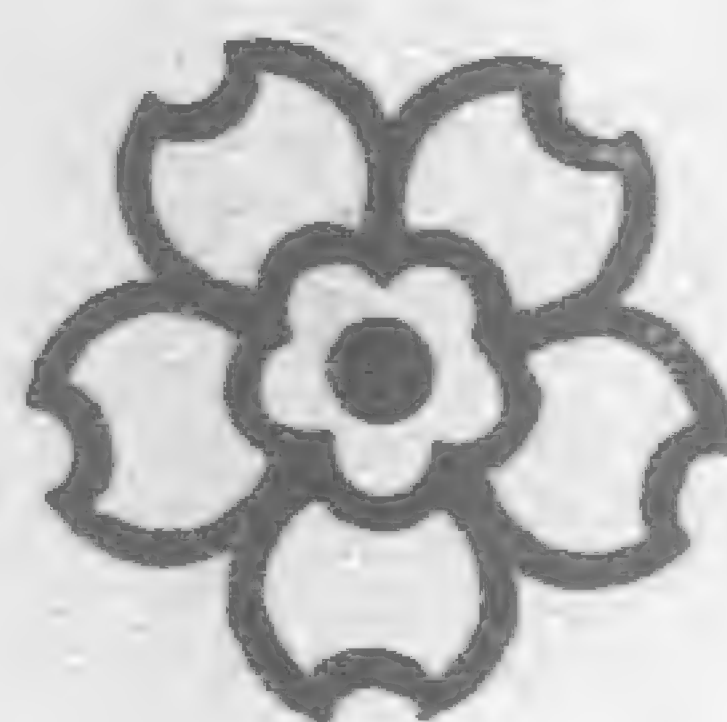
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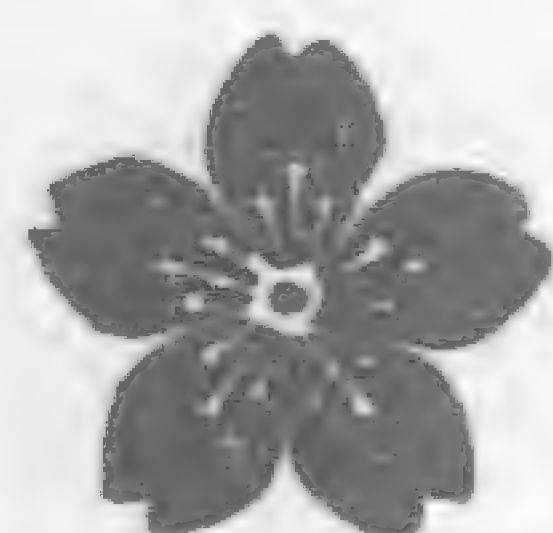
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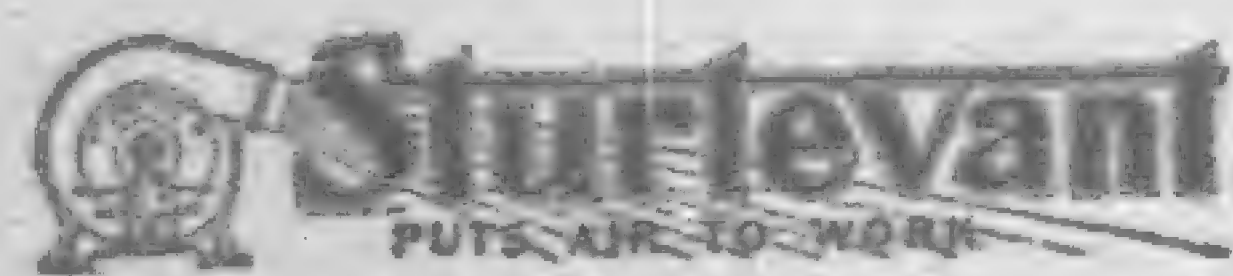
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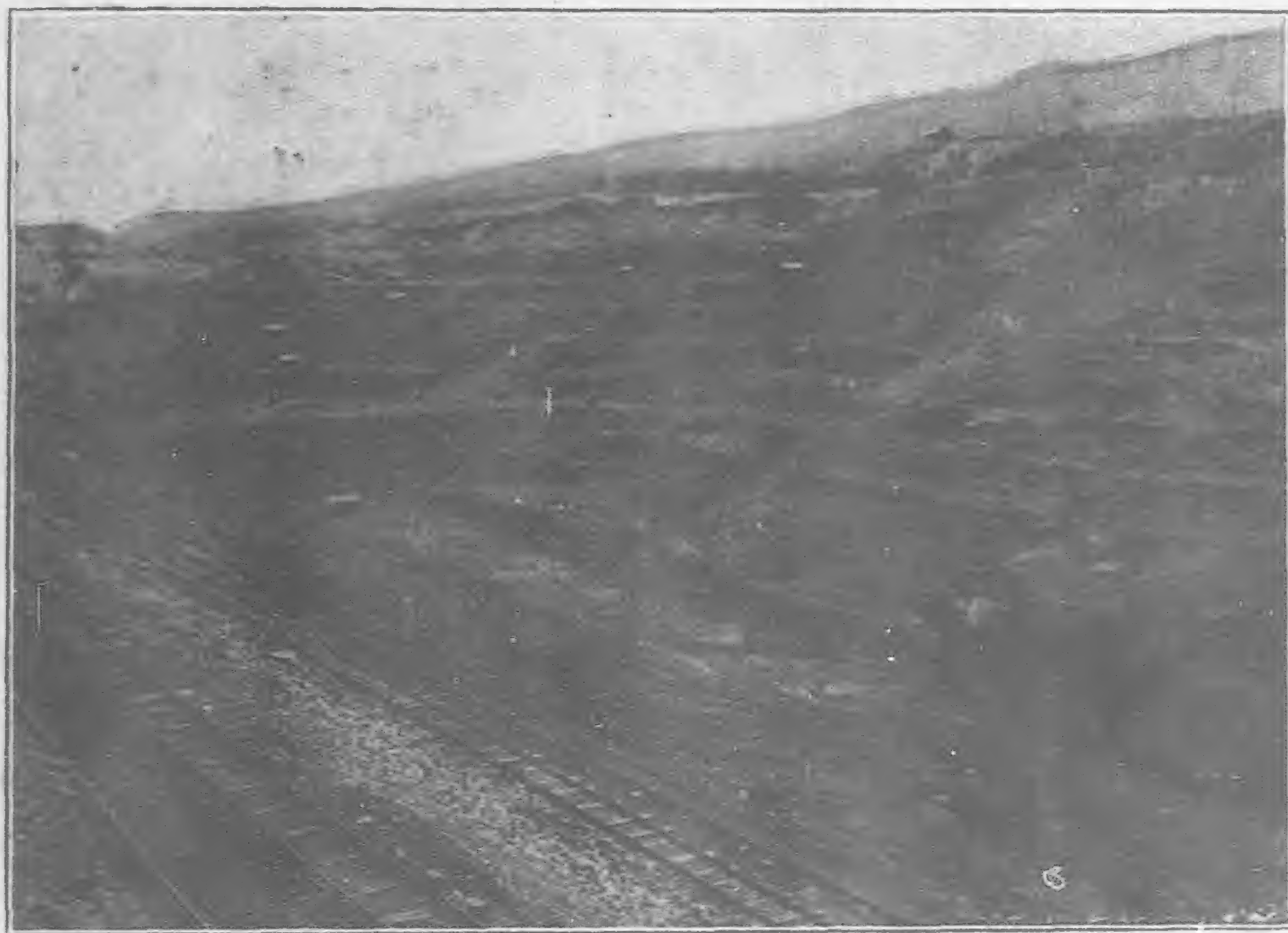
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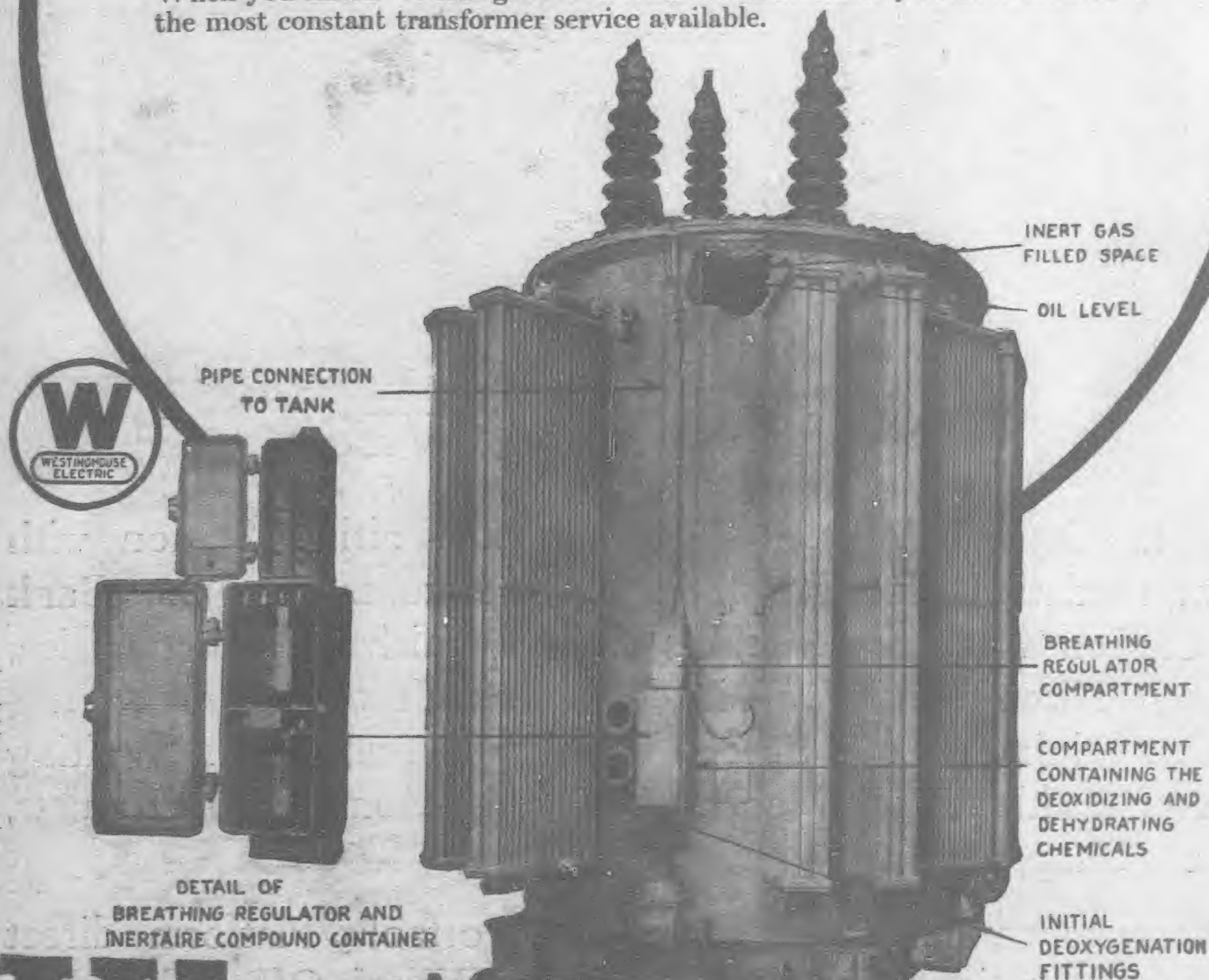
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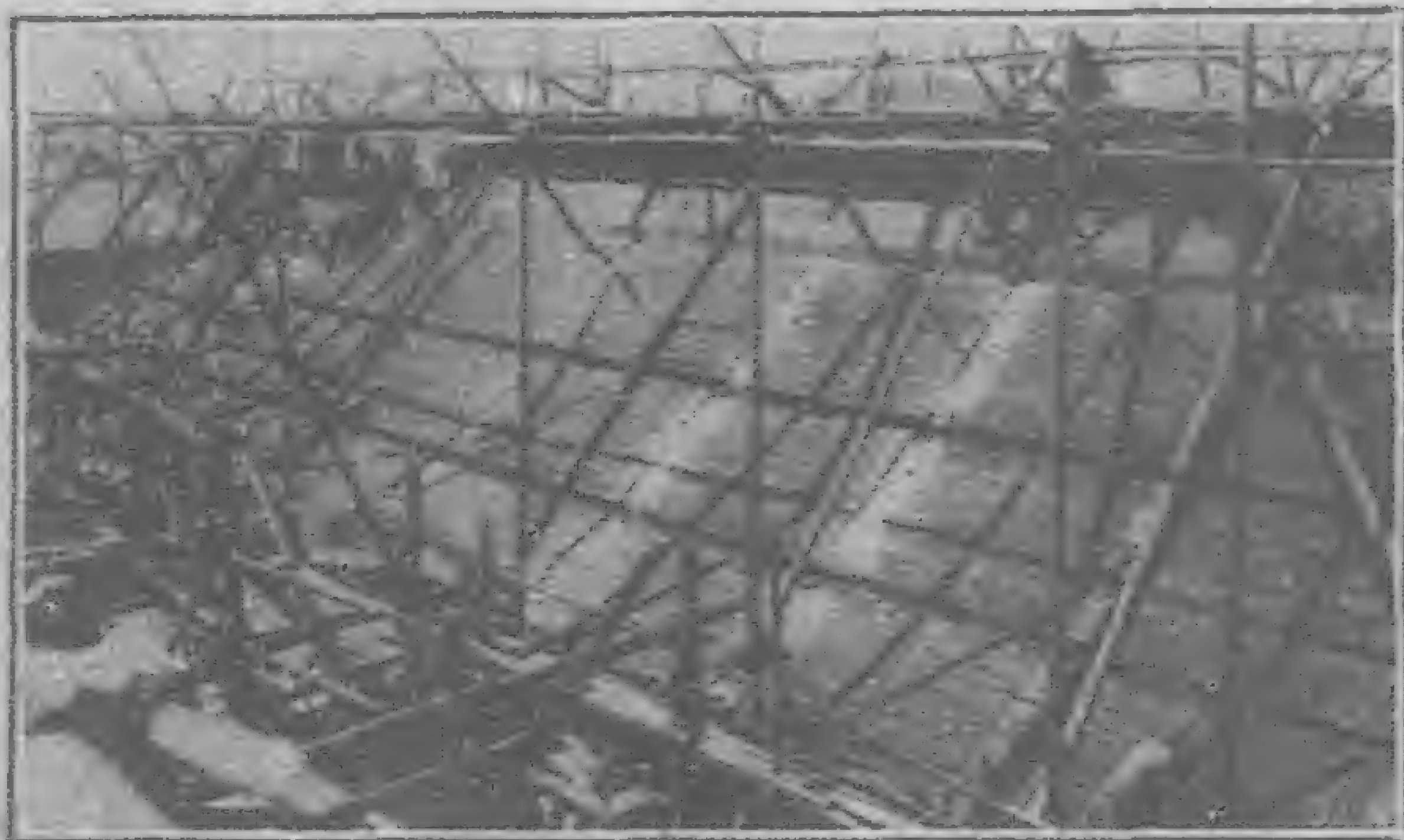
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YOSHIHOTO—EMPEROR OF JAPAN
1912—1926



* The Imperial *
* Family of *
* Japan *



Top left: The Emperor of Japan

Centre: The Imperial Princess

Bottom right: The Empress of Japan

The Far Eastern Review

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No. 1

In Memoriam—Yoshihito, Emperor of Japan 1912—1926

HIS Imperial Majesty, Yoshihito, 123rd Emperor of Japan, died on December 25, 1926 at 1.25 a.m. At the same moment, the Crown Prince who had been Prince Regent for some years, Hirohito, became the 124th Emperor of Japan.

No better statement of the late Emperor's early life can be found than that which was published in the Japan Magazine of September 1912, written by Dr. J. Ingram Bryan, at the moment when Yoshihito succeeded his brilliant father, Meiji, to the throne:

At the solemn hour of midnight, as the immortal spirit of his illustrious father passed into the heavenly places the young Crown Prince, Yoshihito, became the new Emperor of Japan. Seventeen minutes after the great Emperor had ceased to breathe, the new monarch marched into the ancestral hall, escorted by the Princes and Princesses of the Blood, and formally was invested with the Three Sacred treasures: the Sword, the Jewel, and the Mirror which is always kept enshrined in the ancestral sanctuary. These significant symbols of a line issuing from ages immemorial were laid on the table before the Young Emperor, who arose to receive them, as his father had done 45 years before. At the same moment Her Imperial Highness the Crown Princess became Empress of Japan, and the former Empress was designated Kotaigo, or Empress Dowager. Simultaneously the boy, Prince Hirohito became Heir Apparent, and will not become Crown Prince until he reaches the age of 17. Thus at the same moment changed the name of the period; the age of Meiji, the era of enlightenment, became the age of Taisho, the era of righteousness; the period of truth and progress passed into the period of character and consummation. Out of the sombre shades of sunset and melancholy midnight arose the dawn of a newer and even more glorious age. Such is the faith and ambition of the new ruler and his councillors!

To assume the scepter of Empire as the 123rd sovereign of a dynasty born at the dawn of history is an experience possible only to a ruler of Japan. Compared with the Imperial Family of Japan all the kingly and imperial houses of the world are but of yesterday, a circumstance that adds much to the nation's Veneration of its Emperor. With the unique prestige of 25,000 years of family history behind him the young Emperor, Yoshihito, dons the ancestral purple to the acclaim of his 60,000,000 subjects and the good will of the whole world! A reign beginning under such happy auspices bids fair to eclipse even the glory of the nation past. Thus the era of Taisho, the age of Dawn and the age of Day!

Country Prosperous

The Young Emperor opens his reign with his country prosperous and peaceful within, and preserving the most cordial relations with the rest of the world. Upon the foundations of empire laid by his great predecessor and father, his Majesty, Yoshihito, will doubtless erect an edifice that can worthily crown the great work begun. Through all the changes and vicissitudes of time the matchless loyalty of his people will support him, and render him the same devotion received by his father even unto death. Thus out of the night of sorrow following the demise of the beloved ruler

passed away, the worthy son of so worthy a sire brings light and hope into the nation's mourning, he himself the boldest and bravest of all. Above the toll of the funeral knell rises the triumphant "banzai" of faith and loyalty; out of death comes life; out of sorrow joy! Long live the young Emperor!

The new Emperor is the third son of the late ruler, and was born August 31, 1879, his brothers having died in infancy. In 1888 he became Heir Apparent and two years later was made Imperial Crown Prince of Japan. The former sovereign was educated after the manner of old Japan; the new Emperor combines in his education the new as well as the old. At the age of eight years he entered the Peers' College, and passed through the primary and higher departments with marked ability. As a youth he was somewhat delicate of constitution, but by persistence in care for health and much indulgence in outdoor life and activity, he is now physically robust and well. Upon leaving college the young Prince received the rest of his education under private tutors at the Aoyama Palace. Up until the time of his accession most of his morning hours were given to hearing lectures from eminent scholars and professors from the Imperial University, the Imperial student showing a great ability and interest in several branches of learning, but special aptitude for Japanese and Chinese classics. Of foreign languages he made most progress in French and attained remarkable command of that tongue. From a professional point of view the new Emperor is a soldier, though he takes extreme interest in all matters pertaining to the Navy as well. He held the rank of Lieutenant-General in the Army and Vice-Admiral in the Navy; but now, of course, he becomes the Commander-in-Chief of both forces. As soon as the Crown Prince became of age he took his seat in the House of Peers, and showed unabated and intelligent interest in affairs of State.

On May 10, 1900, he married the Princess Sada-ko, fourth daughter of the late Prince Kujo, who now shares the Throne with her Imperial spouse. Of the union were born three princes: Hirohito, April 29, 1901; Yasuhito, June 25, 1902; Nobuhito, January 3, 1903.

A Thorough Education

Thus it will be seen that the new Emperor of Japan has had the advantage of a thoroughly modern education at the public school, mixing from day to day with companions select and worthy; and after reaching manhood and attaining the title of Crown Prince, he ceased not to avail himself of every opportunity for becoming familiar with his country and people. He has journeyed at various times to different parts of the Empire, and even to Korea, so that there is not a corner of his dominions that he has not seen and explored. During his trips inland he ever proved himself an excellent pedestrian and mountain climber, often outspeeding his companions and appearing unannounced among the rustic village.

The writer, who has more than once had the honor of taking luncheon in the same room with His Majesty when he was Crown Prince, noticed how genial he was in manner and how modest in

mien, after the example of his great father, whom he admired even to reverence. It is said that once when the late Emperor and the Crown Prince were in conversation, the great Emperor said to the son: "In the past those in high estate have shown themselves lamentably ignorant of those below them, and are often haughty and arrogant. I pray let it not be so with you; but at all times be ready to help yourself!" This wise counsel the prince has always been careful to observe. When his valet began to tie up the Prince's shoe laces, it is said that often the Prince would busy himself. Wherever His Majesty has mixed with the people he has always much endeared himself to them by his modest and unassuming ways. As a soldier he has always obeyed the regulations to the letter, even joining the mess and partaking of the rough fare of the men, much to their astonishment and admiration. Once during maneuvers when a private was thrown from his horse, and none of the officers appeared to notice it, treating it as a common incident, the Crown Prince jumped from his horse, and helped the fallen man to his feet, greatly surprising all the officers present. When they expressed great awe at his action, he said: "I too am a soldier!"

On another occasion when His Imperial Highness was out hunting he shot a stag; and afterwards when he came in and saw the beautiful animal lying dead in front of the camp, he at once wrote the following poem:

Omoshiroku
Uchi wa shitsuredo
Naku shika no
Koe kiku toki wa
Aware nari keru!

For my own amusement
The fatal shot I fired;
But when I hear the
doe's lament
The pleasure all ex-
pired!

or in prose, "For my pleasure, lovely stag, I brought you down; but when I hear thy fair mate's plaintive voice, my heart is filled with pity!" The Japanese have long looked upon the Prince not only as one that was brave, but benevolent and tender hearted as well.

Her Majesty, the new Empress, has likewise often betrayed the same sterling and gracious qualities that will make her an ornament to the Throne and a mother to the people. As a student at the Peeresses' College the young Princess Sada-ko showed untiring ability in all branches of knowledge; and was especially marked for her humble and womanly demeanor. She always walked to and from school like any one else, and in her studies never fell below fifth in her form. The young Princess ever evinced admiration and respect for her teachers, and on all appropriate occasions still invites them to be present. Her method of bringing up the young princes born to her has won the admiration of the nation.

They are being educated after the manner of their father, the new Emperor, in the plain and frugal way of the soldier. Certain companions from among the sons of the nobility are chosen for them as playmates, and they have good times like other boys, playing in the afternoons in the Imperial gardens. The young princes attend school regularly every forenoon at the Peers' College, play from 2 to 4 o'clock with their playmates, and spend the rest of the evening at indoor amusements, being specially fond of moving pictures. Not infrequently the Imperial parents join in the children's fun and add to the afternoon's pleasure. Not long ago the young princes discovered some tadpoles in a pond in the garden and jumped into the muddy water almost up to the neck to capture them, much to the consternation of the attendants. Boys will be boys, even if they are of Imperial blood!

Thus the new Emperor, Yoshihito, and his gracious consort, Sada-ko, represent the true Japanese family; keen and intelligent with regard to all that concerns the nation, and in character and habits, simple and unostentatious, winning the same sympathy and devotion that the nation so lavishly bestowed on the departed Emperor.



The Empress Dowager of Japan

During the reign of the Emperor Yoshihito, the history of Japan has been one of brilliancy and greatness. Following upon the Meiji period which was one of dramatic interest, the period of Taisho was one of stabilization. During the Meiji era, Japan was constantly reforming, changing in every direction, from a feudal, small island kingdom, to a modern state. During the Taisho period Japan settled down to her position of equality with the great nations of Europe and America, until after the Great War, Japan was recognized as one of the five great nations of the earth. It is difficult to realize that any state could achieve such preëminence in so short a period; yet that is what Japan has accomplished. During the earlier period, Japan fought two wars to assert her rights as a great Power, but during the reign of Yoshihito, on the whole, Japan was at peace with the world, except during the Great War, when Japan supported the Allies and maintained the peace of the Pacific. Japan's accomplishments during this era were the accomplishments of peace; the rewards were the rewards of hard labor, of the application of modern science to industry and commerce, of the energy and courageousness of the subjects of the Emperor, whose constant thought was of their country and its place in the sun. As difficult as it may be for others to understand, the intense loyalty of the Japanese people towards their Emperor, to the Imperial Family and to their country, the history of the past fifteen years of Japan, offers constant and noteworthy examples of the high patriotic virtues which are the basis of Japanese social and political life.



H.I.H. Prince Sumi

Japan and the War

The first important event in the International Relations of Japan during the past reign was the declaration of war on Germany and the seizure of the German colony of Tsingtao which fell into Japanese hands on November 7, 1914. The

The Peace Conference and Democracy

During the same year, the Versailles Conference took place at which Japan's position as the leading nation in Asia and one of the five principal Powers of the earth was recognized. Japan's position at this Conference made a tremendous historical change in the affairs of the world, as for the first time, an Asiatic Power was in a position to deal with the affairs of Europe, America, Africa and Asia, as a Great Power. It was this preëminence which is in a marked manner responsible for the shifting of the center of political interest from the Atlantic to the Pacific. Japan not only was consulted about things Asiatic but was recognized as having a definite voice in every phase of international politics. Japan's leadership in the League of Nations and her attendance at International Conferences, marked an end to European supremacy in Asia.

One of the results of Japanese participation in the war was that the ideas of democracy became more widely spread throughout the country. In 1920, a bill was introduced in the Diet for the extension of suffrage on the principle of more universal manhood suffrage. To test the popularity of this act and to determine whether the Japanese people really wanted an extension of suffrage, the Diet was dissolved. The Premier at this time was Hara, the first Commoner to reach such a position in Japan.

During the same year Japan and Korea were more closely united by the marriage of Prince Yi, heir to the principality of Korea and Princess Masako Nashimoto on April 28. It was during this month when the Japanese people were at peace with all the world that the Nikolaevsk incident took place. The Japanese Consul at this city and 220 Japanese subjects



H.I.H. Prince Chichibu

capture of Tsingtao by Japan was an event of the greatest importance to the Allies, for as long as Germany held this well developed port, she possessed a naval base on the Pacific which could at all times, be used for naval expeditions against the Allies and which endangered the peace of the Pacific. Whatever may have been the immediate attitude of Japan toward this possession, it is historically important to note that even after it was seized by Japan as an act of war, after Japanese blood had been spilled, Japan eventually returned to colony to China, an act of graciousness which the Chinese people will not soon forget.

During the following year, the incident known as the Twenty One Demands occurred. Again, one need only note the full historical effect of the incident. Japan concluded certain treaties with China during 1915, which prolonged Japan's lease of the Liaotung peninsula and made economic agreements with regard to the Hanyehping Iron and Steel Works, but on the whole the 1915 Treaties have in no way impaired the sovereignty of China and have only served as a check upon the Russian imperialistic designs in Manchuria and Mongolia.

In 1918, Japan embarked upon a plan to impede the advance of the Bolshevik Government in Soviet Russia toward the East. Assisting Attaman Semenov, the Terauchi Cabinet sent an army into Siberia. There has been considerable criticism of Japan for this enterprise; yet events have again shown that Japan's attitude was the correct one. Had Japan been able to force the Communists to limit their activities to Europe, had they been kept out of Asia, had a Buffer State been founded in Siberia to act as a bulwark against Bolshevism, many of the problems in Asia which are now facing the world and which are slowly but with apparent sureness leading to a world war, might have been avoided.

were massacred by partisans of Soviet Russia. The Japanese immediately occupied Nikolaevsk on June 3, but on July 17 this region of Siberia was evacuated by the Japanese troops.

An event occurred during 1921 which is unparalleled in the history of Japan and which shows how thoroughly Japan has assumed its responsibility as a modern nation. His Majesty, the Emperor of Japan, then Crown Prince Hirohito, left Japan to visit Europe. His trip through Europe was a tremendous success and achieved much in cementing the sentiments of good will between Japan and the European Powers. His Majesty returned to Japan on September 3 having spent six months in his travels abroad.



H.I.H. Prince Takamatsu



The Hayama Detached Palace where the late Emperor Passed Away



The Imperial Palace, Tokyo

Washington Conference and American Friendship

On November 12, 1921, the Washington Conference for the Limitation of Armaments was opened in the city of Washington. The Conference met by invitation of the American Government and although it was designed to lessen the possibilities of war in the Far East and in Europe, it also considered the whole question of the Far Eastern relationships. This is not the place to discuss the achievements or the failures of the Washington Conference. Suffice it to state that all possibilities of enmity between the United States and Japan found their destination at this Conference. The Japanese and American Governments came to an understanding and the Japanese and American peoples realized each others problems and difficulties and sought to reconcile them. From that time onward the jingoes in both countries were without any basis for continuing their war talk and a period of friendship between Japan and the United States came into being which is hoped that will never have an end.

During 1922, Japan took the initiative and concluded a treaty with China by which all Japanese rights in the German Concessions in Shantung were returned to China. This is perhaps one of the most unique events in history, where a Great Power returns to a weaker Power, rights won in the course of a war. Shortly after this, Sino-Japanese friendship societies came into existence in China, indicating the value of the policy of friendship between the two great oriental nations. Japan, at this time, frankly announced a change of policy *vis-a-vis* China. Admitting that many unfortunate incidents had occurred in the past, the Japanese now announced that in China, they would follow a policy of friendship for the Chinese people.

During the following year, a disaster occurred, which tested the character of the Japanese people. An earthquake took place in the region about Tokyo and Yokohama, in the course of which 91,000 persons were killed; 52,000 injured; 13,000 missing. The loss in property from the earthquake and subsequent fire amounted to five and one half billion yen. Much of the materialistic achievement of half a century of heart-breaking labor was wiped out in the twinkling of an eye. Japan was burdened with a huge national indebtedness. Nevertheless, the Japanese people stoutly set themselves to the task of rebuilding their empire.



The Akasaka Palace; Residence of the Emperor as Prince Regent

The story of their heroic work in this respect is graphically described in the Reconstruction Number of the "Far Eastern Review."

The marriage of H. I. H. Prince Regent Hirohito and H.I.H. Princess Nagako Kuni, took place on January 26, 1924.

The first month of 1925 saw the conclusion of lengthy negotiations between Russia and Japan for a new treaty which was signed at Peking on January 21, by Mr. Yoshizawa and Mr. Karakhan. Diplomatic relations between the two countries were resumed. The treaty gave Japan rights in Saghalien.

Foreign Trade

For many years previous to the outbreak of the World War Japan remained an importing country. Practically every year she suffered from adverse trade balance. But with the outbreak of the European War, the position changed and Japan became an active exporting country. Especially great was her export in 1917 that the excess of export over import for the year amounted to Y.560,000,000. Thus at the end of four years her excess of export aggregated to Y.1,400,000,000. Against this, Japan exported during this period bullion and silver to the amount of Y.300,000,000. The balance Y.1,100,000,000 was the net profit that accrued to her. Of this sum, Y.1,000,000,000 was used for the partial redemption of her national loans and debentures of private companies raised abroad and the subscription to foreign loans. But she still held about Y.1,000,000,000 of specie abroad. In addition to this, receipts from the invisible assets made an enormous increase so that her possession of specie both in the country and abroad became exceptionally large. Naturally, the circulation of money increased, many new enterprises came into existence.

However, this boom did not last long, for with the conclusion of the Armistice in 1918 there was a sudden halt in Japan's export activity. Trade returns for 1919 showed that her import had again exceeded export by Y.74,000,000. This tendency has been accelerated especially since the panic of 1920. Owing to heavy import of reconstruction materials after the earthquake, the excess of import over export during 1923 augmented to such an enormous figure as Y.536,000,000 and in the next year

the excess further increased to Y.646,000,000. The gross total of the excess of import for five years after 1919 aggregated to Y.2,520,000,000. In addition, Japan imported during this period bullion and silver to the amount of Y.860,000,000.

The government, while continuing to follow the policy of floating fresh loans, hesitated to carry out a retrenchment policy lest the adoption of such step at the time should cause the bankruptcy of many enterprises. That had been started at the time of the boom. Thus, in spite of the fact that Japan was to receive from the invisible assets Y.384,000,000 in 1923 and Y.407,000,000 in 1924, she had to pay Y.238,000,000 in 1923 and Y.319,000,000 in 1924 in settlement of the debt incurred by foreign trade. The following table shows her trade tendency since the outbreak of the European War.

	Export Yen	Import Yen	Balance Yen
1915	708,306	532,449	+175,857
1916	1,127,468	756,427	+371,040
1917	1,603,005	1,035,811	+567,193
1918	1,962,100	1,668,143	+293,956
1919	2,098,872	2,173,159	-74,587
1920	1,984,394	2,336,174	-387,780
1921	1,252,837	1,614,154	-361,317
1922	1,637,451	1,890,308	-252,856
1923	1,447,750	1,982,230	-534,476
1924	1,807,233	2,453,390	-646,157
1925	2,305,095	2,571,804	-266,709

Unit 1,000 yen

China Trade

The greatest consumer of Japanese goods in Asia is China. Next come British India, Kwantung Territory, and Hongkong. The export to China was not much more than Y.100,000,000 in 1912. It made a rapid increase throughout the wartime and in 1917 the total export amounted to Y.300,000,000. In 1919 it still increased to Y.440,000,000, which was the highest record. Since then, there has been declining tendency and in 1924 the total amounted to Y.340,000,000.

India used to be a poor market for Japanese goods, but since the World War the export from Japan to that country has greatly increased. During 1918 more than Y.200,000,000 worth of goods were shipped to India from Japan.

In Europe, France is her greatest customer and Britain comes next. Although Britain overtook France during the war, she again fell to second place after the cessation of the War. The total exports to France amounted to Y.85,000,000 and to Britain Y.61,000,000 during 1924.

The United States

Trade with the United States has also been increasing yearly. In 1900, Y.52,000,000 worth of Japanese goods found way to that country. Four years after, the total export reached Y.100,000,000. However, it was after the outbreak of the Great War that her absorption of Japanese goods made an especial increase. During three years that followed 1915, Japanese export to the United States steadily increased at the rate of Y.100,000,000 a year. The peak was reached in 1919 when the figure showed Y.830,000,000. In other word, more than 40 per cent. of Japan's total export goes to the United States.

Money and Banking

Along with the development in the economic world, the financial state of Japan improved steadily. A review of business results of banks in the country will show that both their

advances and deposits are now five times larger than fifteen years ago.

	1912 Yen	1925 (June) Yen
Capital paid-up	570,488,740	3,076,565,250
Reserve funds	199,579,836	1,995,356,146
Deposits	2,025,493,908	11,146,851,093
Advances	2,594,545,718	12,904,107,518

Speaking only of ordinary banks, their total advances made during 1916 and 1918 were always smaller than deposits, which proves that their way of handling capital was sound. But from the year which preceded the great panic the amount of advances made by them became larger than the amount of deposits, the excess reaching Y.100,000,000. In 1924, this excess of advances over deposits became so large a sum as Y.340,000,000. As a result of the readjustment of economic system, which was effected later on, the margin was diminished and at the end of 1925 total advances were Y.8,702,000,000 while deposits amounted to Y.8,767,000,000. As the financial authorities have encouraged consolidation of banks, the number of banks in the country made a decrease during the fifteen years. In 1912 there were in the country 2,151 banks. According to the investigation made in June, 1925, their number was but 1,755.

Foreign Exchange

From 1912 to the end of 1914, the exchange value of the Yen against American Dollar always remained above 49 dollars per 100 yen. Due to adverse trade, the Yen declined to the level of \$48 in February of 1915. But owing to subsequent improvement in her foreign trade, the rate was brought back to \$49 level in November of same year. As the trade position of Japan continued to improve thereafter, her currency made a steady advance. In June, 1916, the actual rate of Yen on New York was quoted at

50 dollars and at \$50- $\frac{1}{2}$ in August of 1917. It was about that time that the Japanese Yen on the Shanghai market was relatively under-rated in comparison with the quotation on the Gold Bar Market there. This fact did not escape the attention of speculators who believed in further appreciation of gold, and heavy purchases of the Yen ensued.

Thus, from the end of 1916 to August of the following year, more than Y.64,000,000, of Japanese specie were remitted to China. As there was every indication of a further outflow of her currency in like manner, the Japanese Government, following the example of the American Government, placed a ban on the export of her specie and gold bullion in September of 1917. The embargo, however, did not prevent the improvement of the Yen and in May of 1918 it reached the \$51 level. It was finally boosted up to 52- $\frac{1}{2}$ in December of same year.

Meanwhile, the wartime boom in her foreign trade began to wane, and accordingly, the Yen gradually lost ground. In March of 1919 it depreciated to 50 dollars and in December of same year further declined to \$49. The downward movement was accelerated as her trade balance continued to deteriorate. The Yen finally broke the \$48 level and stayed at \$47- $\frac{1}{2}$ for two ensuing years.

Thanks to Government measures which aimed at maintaining the exchange value of Yen at \$49, the rate again rose to that level. However, the



Prince Saionji, The Last of the Genro



Count Chinda, Lord Steward to
her Majesty



Baron Kuratomi, Chairman of the
Privy Council

heavy imports of reconstruction materials, after the Earthquake disaster, made her trade situation still worse, and the Yokohama Specie Bank was compelled to give up the \$49 rate in December of same year.

Under such circumstances, the announcement by the Government of a more liberal policy in regard to the release of government owned specie abroad which took place in January of 1924 and the conclusion in London of negotiations for the floatation of 6 per cent. Japanese Public Loan to the amount of 25,000,000 pounds in March of same year had little effect on the exchange market, but the Yen continued to depreciate. In April the rate fell to \$38- $\frac{1}{2}$. Although it again rose to \$40 later on, the actual exchange touched the bottom of \$38 in September of same year.

It was the bearish activity of the Yokohama Specie Bank which was commenced in February, 1925, floatations of foreign loans by various Japanese Companies, and the decrease in the excess of imports in her foreign trade that lifted the Yen from this bottom to \$41 and later to \$42.

The decision made by the Government to ship a certain amount of specie abroad gave rise to speculation on Yen on



Mr. K. Ichiki, Minister of the Imperial House-
hold Department

foreign markets, which, coupled with the depreciation of silver, helped much the recovery of the Yen afterwards. In April, 1926, the rate stood at \$47 and in August rose to \$48. The successful floatation of the Municipal Loan of Yokohama on London market further strengthened the position of Yen and it was finally brought back to \$49 level.

The last quotation for 1926 was \$48- $\frac{3}{4}$.

Insurance

Ever since the Meiji Life Insurance Company, for the first time, was organized by Messrs. A. Obata, H. Shoda, S. Ogura, and T. Abe in 1880 with an authorized capital of Y.100,000 insurance business in Japan has made a steady growth.

In 1912, there were at least 33 insurance companies in Japan. Among others, the business conditions of the three leading underwriters were as follows:

	Outstanding number of contracts	Total of In- surance Money Yen
The Nihon Life ...	204,628	100,654,958
The Meiji Life... ..	124,041	86,646,800
The Teikoku Life ...	143,116	82,156,440



Count Makino, Keeper of the
Privy Seal



Count Tokugawa, Grand Chamberlain

The death of the Emperor Meiji took place in the same year, and while the whole nation lamented it deeply, the event apparently served to arouse the people to the necessity of their lives being insured. Consequently all insurance companies did an active business that year. Twenty-five more insurance companies were newly organized in this year.

At the outbreak of the War some insurance companies fixed special wartime premium, but most of underwriters of old standing, in the light of their experience during the Russo-Japanese War, did not show much concern about the new war. As a matter of fact, the War entailed comparatively small loss upon them, but the dreadful epidemic which was popularly known as "Spanish Influenza," which found its way into Japan in the Autumn of 1918, and swept the whole country in a short time, caught mainly people of well-to-do classes rather than those in lower classes. The deathroll of youths and full grown



Baron Iwasaki

The disturbances in the economic circles in 1920, seemed to have caused not so much damage in this particular branch of business. But this can only be said in comparison with other enterprises which had been fatally hit. While on one hand, insurance companies suffered considerably from the depreciation of stocks and shares as well as immovable properties that were their assets, had, on the other hand, to face the difficulties such as the decrease in new contracts and the increase in the number of discontinuations and the difficulty of collecting premium money. A glance into the business results of these companies for this particular year will enable one to understand the trying circumstances in which they were placed.

	Number of new contracts	Contracted Insurance money Yen
1919	666,000	614,534
1920	619,157	639,328
1921	557,677	621,416
1922	575,697	699,988
Unit 1,000 yen		

Leaders in Finance in Japan



Baron Okura

men was great. The epidemic ravaged the country for about half a year and finally disappeared in the spring of the following year. But the loss it caused to the Life Insurance companies was heavy. The number of people who had been insured and succumbed to the disease totalled, according to the investigation made at the end of April, 1919, 9,873, and the insurance money actually paid by various underwriters amounted to Y.6,650,747. In the Autumn of the same year, the disease again made its appearance, and caused even greater number of deaths among the people than on the previous occasion. The loss of insurance companies is said to have exceeded Y.10,000,000.



Baron Shibusawa



Mr. Kodama

The Earthquake disaster of the city of Tokyo in September, 1923 which involved deaths of more than one hundred thousand people set all insurance companies at a loss as to how to meet the situation. But, with the elapse of time, it became known that the deathroll of those insured against their lives was not of such a long one as had been expected. The following table shows the number of insured persons who had perished in that disaster and whose insurance money had been paid by the main insurance companies.

Denomination of companies	Number of claims made	Total amount paid Yen
Nihon ...	481	642,045
Chiyoda ...	287	653,264
Daiichi ...	167	325,000
Daido ...	207	262,650



Mr. Y. Kasuya, Speaker of the House of Representatives

Denomination of companies	No. of claims made	Total amount paid Yen	Denomination of companies	No. of claim made	Total amount paid Yen
Yachiyo...	...207	42,200	Yurin ...	...196	193,600
Teikoku...	...296	289,055	Meiji ...	...532	673,240
Kyoho ...	... 99	164,200	Jinju ...	...434	419,220
Kyosai ...	...260	257,700			

The exact amount of loss incurred by all insurance companies put together was Y.5,767,155 which was paid to 4,281 cases.

After the calamity there has been rising tendency among the people in general to have their lives insured, which, coupled with the desperate efforts on the part of underwriters to increase number of new contracts, has brought the business back to the way of steady growth. At the end of 1925, there were no less than 45 insurance companies in Japan, of which main ones are given on the next page :



Mr. R. Wakatsuki, Premier of Japan



Prince I. Tokugawa, Speaker of the House of Peers



Baron Shidehara, Foreign Minister



Mr. I. Fujisawa, Minister of Commerce and Industry



Mr. K. Adachi, Minister of Communications

Denomination	Capital	Total		Location
		Insurance	Money	
	Yen	Yen		
Nihon	3,000,000	562,323,000	Osaka	
Meiji	2,000,000	413,556,000	Tokyo	
Teikoku	1,000,000	361,584,000	"	
Chiyoda	360,000	372,268,000	"	
Dai Ichi	300,000	297,551,000	"	
Jinju	2,000,000	196,163,000	"	
Kyosai	300,000	204,123,000	"	
Daido... ..	300,000	215,724,000	Osaka	
Yachiyo	5,000,000	264,354,000	Tokyo	
Kyoho	1,000,000	130,428,000	"	
Nihon Chohei ...	2,500,000	115,041,000	"	
Yurin	300,000	116,650,000	"	
	Yen	Yen		

Shortage of bottoms was felt universally and the keen demands for more vessels caused an unusual development in the ship-building business in the country. Dockyards were constructed in every part of the country, where work went on at full capacity. Prior to the World War, there were only 6 dockyards in Japan capable of building vessels over 1,000 tons and workers employed at these yards numbered not more than 26,000 in all. In October, 1918, just before the Armistice, the number of dockyards of same size was increased to more than 9 times larger and that of workers over 4 times larger.

	At the end of 1913	At the beginning of October of 1918
Number of Shipbuilding Companies	5	53
Capital Paid-up	Y.23,150,000	Y.109,554,000
Number of Dockyards	6	57
Number of Slips	17	157
Number of Workers	26,189	107,260

Marine Transportation and Ship-building

Japan had on two occasions, prior to the outbreak of the World War, made unusual expansion in shipping. The one was the period which came immediately after the conclusion of the Sino-Japanese War and the other was the period which followed the Japanese War. It was on the former occasion that the Laws for the Encouragement of Marine Transportation and Ship-building were promulgated and the present Toyo Kisen Kaisha was organized. On the latter occasion, the system of subsidizing ocean navigation was established. Thus the shipping business in Japan continued to grow every year and at the outset of the World War there were in the country more than 3,400 steamers with a total tonnage of 1,590,000, belonging to various shipping companies as well as owned by private persons.

Although Japan participated in the War on the side of the Allies, the particular position she held geographically enabled her shipping to suffer less from the destructive work of German submarines, and they made a large profit while the War went on. The marine transportation business in Japan presented quite unprecedented activity and was at the height of its prosperity during this period.



Baron Hachiroemon Mitsu

On account of the increase in the number of dockyards, building of new steamers and sailing-vessels greatly increased. The number of steamers that were launched during this period of maritime prosperity is as follows.

	Number of Ships built	Total tonnage
1914	79	82,873
1915	62	51,431
1916	94	144,240
1917	196	403,016
1918	377	626,695

The extension of the scope of activity by shipping interests of Japan also marked this period. Since the outbreak of the European War, regular services, established either by the Government or the steamship companies numbered more than 40. Of these, several lines were subsequently discontinued.

With the termination of hostility in Europe, the vessels that had been commandeered by the belligerent governments were returned to their owners, and many lines that had been in suspension were reopened by shipping companies of European countries. Moreover, big liners that had been in course of construction in America in accordance with her big ship-building plan were successively launched, while desperate efforts were concentrated on the reconstruction of the crippled shipping

system by Britain and France. These facts inevitably affected adversely the shipping business in Japan and the demand for her bottoms suddenly decreased. The panic of 1920 further made the movements of cargo slower. The freight and charterage fell quickly.

In these circumstances, important companies like the Nihon Yusen Kaisha and the Osaka Shosen Kaisha, though hard hit, had still enough means to cope with the situation, but many less important ship-owners, who could gain enormous profit during the boom, but had not prepared for the depression, collapsed.

Since then, the only policy pursued by the shipping interests in Japan seems to have been the maintenance of the status quo. However, Japan still holds the position of being the third biggest country in the world in regard to the number of vessels.

The following is the list of existing leading shipping companies in Japan:

Name	Number of steamers	Total tonnage	Location
Nihon Yusen	94	608,137	Tokyo
Osaka Shosen	96	422,589	Osaka
Kokusai Kisen	55	295,850	Kobe
Kawasaki Zosen	22	131,286	Kobe
Kinkai Yusen	39	961,182	Tokyo
Mitsui Bussan	23	78,880	Tokyo
Kawasaki Kisen	21	78,804	Kobe
Toyo Kisen	11	64,898	Tokyo
Nisshin Kisen	18	43,042	Tokyo

COTTON YARN

Cotton spinning industry in Japan made great strides just after the conclusion of the Sino-Japanese War. The outbreak of the Russo-Japanese Conflict temporarily paralyzed its activity, but after that war it again became flourishing. However, it was the World War, that contributed mainly to make the industry to its present greatness.

During a few years that preceded the World War, the industry was in rather a depressed condition, though there had been repeated ups and downs. At the outbreak of the War the slump of raw cotton price, the suspension of foreign exchange market, the sharp depreciation of silver, combined to cause the collapse of cotton yarn market. As the War went on, however, the apprehension generally entertained gradually turned to hope, for the demands of war materials that were made by belligerent countries in Europe to neutral countries were quickly increasing. The export trade of Japan was also enhanced. The improvement in financial condition of the country consequent upon the increase in her foreign trade naturally encouraged the rise of prices in general. Thus in 1916-1917, Japan was at the height of her economic prosperity.

There was a slight slump at the beginning of 1916 through the outburst of the revolutionary disturbance in South China, but even this did little affect the general trend of the Industry which was in full swing. Meanwhile, the country was enjoying an unprecedented boom in her industrial undertakings as a whole. Prices of manufactured goods continued to rise and that of cotton yarn was by no means an exception. It now advanced from Y.130 which obtained at the beginning of 1916 to Y.140 in July of same year. It did not stop there, but continued to rise so that in November 195 yen was reached.

The participation in the War by the United States which occasioned a sharp decline in raw cotton price in that country; the ban placed on the import of hosiery goods by Britain; the dispute that arose over the Customs Tariff in China, each considerably affected the cotton yarn market in Japan, but nevertheless the Industry grew steadily. Under such circumstances, it was inevitable that speculative inclination should be developed among the people and the price finally boosted up to Y.470 in July of the following year.

A speedy expansion in the scope of spinning industry naturally took place, which will be seen in the following table.

	Number of Mills	Capital paid-up	Total Output	Average Price per bale
1912	93	T.66,161,272	67,912,083 Kwan	Y.141
1913	100	Y.77,575,272	81,254,499	T.143
1914	103	Y.81,236,874	82,342,487	Y.120
1915	272	Y.85,279,734	85,288,449	Y.122

While the country was still in the wake of the panic of 1920, the Great Earthquake of 1923 occurred. By the disaster, the Industry lost nearly 900,000 spindles, or 20 per cent. of its producing power. Spinning industry in Japan in the years that followed has had very hard time, for on the one hand it had to cope with the declining tendency in price, on the other hand utmost efforts should be devoted to make up the damage sustained by the earthquake disaster.

To say only of the Year 1926, the rich crop of raw cotton in America, decrease of export through recovery of exchange value of the Yen, the internal disturbances in China, great slump in silver, over-production in anticipation of the enforcement of the abolition of deep night work, all adversely affected the market.

Silk

The last fifteen years under the reign of the late Emperor may be recollected with gratification by the silk trade. The industry was placed on a firm basis during the preceding fifty years, while the subsequent period of fifteen years was characterised by a remarkable improvement in the raising of cocoons and reeling of silk, which added much to the reputation of Japanese silk abroad. The demand grew during this period, though figures flattened in some years, as shown in the following export table taken from the *Osaka Asahi* :—

Year.	Bales in 1,000.	Value in Y.1,000.
1912	171,022	150,321
1913	202,286	188,916
1914	171,487	161,797
1915	178,141	152,030
1916	217,419	267,036
1917	258,289	355,155
1918	243,444	370,337
1919	286,225	623,618
1920	174,687	382,716
1921	262,028	317,124
1922	344,372	670,047
1923	263,280	566,169
1924	372,564	685,365
1925	438,262	829,497
1926 (to Dec. 10)	337,500	564,325

The silk trade is justly regarded as one of the large sources of the national wealth and occupies a unique position in the world commerce, the movements in the Japanese market being closely followed by centres abroad. The trade, however, has had its ups and downs in the past fifteen years as indicated above. There were three crises faced by the trade during the period under review. The first crisis came in 1914-1915 with the outbreak of the World War the second in 1920-1921, when the after-war reaction overtook world-commerce, and the third this year. The difficulty recently faced was due to slow absorption of the commodity in Europe and America, followed by a glut in the market. The course of action chosen by the trade, with assistance from the Government, however, has proved effective and normal conditions have emerged, with a bright outlook held out for business next spring.

There is a pessimistic opinion voiced in the market. The death of the Emperor it is stated, may affect the consumption at home of silk piece goods, which may increase the supply of raw silk in the export section. But on the other hand, it may be observed that the home consumption of piece goods suffered very little fifteen years ago, when the Emperor Meiji passed away. The stagnation the market recently experienced was due to slow trade with other markets than the United States, where a watching attitude was assumed owing to a lower price that was expected under the glut. The stabilisation policy has been carried out and after the reserve, the United States has begun to buy on a large scale, which has given rise to an optimistic opinion of business in sight. Taking all things together, it is safe to expect a recovery in the silk market in the near future.

COAL.

Japan abounds in coalfields. But their exploitation had long been neglected. It was only after the Restoration of 1867 that serious efforts began to be devoted to the mining of coal. Among others, the coalfields in Nagasaki prefecture owned by the Mitsubishi Company, those in Fukuoka prefecture owned by the Mitsui Company and various collieries in Hokkaido were the most noted coal districts. The production especially increased after the Sino-Japanese War and also after the Russo-Japanese

War. In a word, coal mining in Japan thrived when economic condition of the country was on high tide and depressed when business in other fields was inactive. Thus, during the period of business depression which came in reaction of the post-war boom of the Russo-Japanese conflict, the coal mining industry was naturally in a depressed condition. In 1912, there were about 500 coal mines in the country which were actually operating. The marked increase in the demand for coal in consequence of the increase in factories and works that cropped up successively after the outbreak of the World War, induced a speedy development of coal mining business, as will be seen in the following table.

	Number of Mine-lots	Number of Mining companies	Capitals invested in coal mines
1913	546	91	62,705
1914	585	100	77,550
1915	524	113	76,458
1916	530	116	78,458
1917	663	118	111,495
1918	740	146	174,496
1919	789	203	355,030
1920	731	273	365,589
1921	615	321	414,385
		330	

All collieries went on thriving until 1920 when many mining companies had to be dissolved. But those companies who survived this economic crisis soon rallied strength and the business apparently was on the way to recovery, when another crisis came in the form of the Great Earthquake in 1923. The event inflicted not a small loss to various coal interests. The import into the country of the Fushun coal which showed a great increase about this time also proved a menace to the coal business of Japan. As counter-measure, miners were obliged to restrict the output of their mines, thereby calculating to raise the price of coal, while, on the other hand, an agreement was reached to put a limit on the import of Fushun coal.

OIL.

As stated above, Japan produces more coal than is actually wanted in the country. But she is very poorly provided with resources of oil. Taking aside Niigata prefecture, in which are found several noted oil-fields, there are but a few districts in Japan which can produce oil. Previous to 1912, the yearly output of oil ranged from 1,800,000 koku to 1,500,000 koku (a koku is about 4 gallons.) This scarcely was sufficient to meet the demand of the whole nation, so about double that amount of foreign oil had to be imported every year.

By the introduction, however, of the Rotary Boring system the production of oil in the country made a sudden increase after 1912. Moreover, a new oil-field was discovered in Akita prefecture in 1914, which surprised the world by spouting more than 10,000 koku a day. By these, the oil situation in Japan was improved to some extent.

But after all, even this increase in the production of oil could scarcely solve the question of oil shortage, which became more acute after the outbreak of the World War, because of sudden decrease in the import of foreign oils.

Naturally prices jumped upward. The average price of crude oil which ranged from yen 6.90 to yen 4.28 per koku in 1912 appreciated so sharply during the wartime that it was quoted from yen 23.94 to yen 22.05 in 1919. Oil development was greatly encouraged in the country, even obsolete oil-wells being now re-exploited. Thus from 1914 to 1919 more than 14 new oil companies were organized.

As will be seen in the following table, 1916 was the record year for Japan in regard to her oil production, but after that year the production gradually diminished. The stoppage in the import of iron tubes, which are indispensable in the oil-mining business, due to the United States' prohibition of the export of iron and the rise in the fuel prices were given as main causes for this alarming phenomenon, but, above all, it was undeniable that the existing oil-fields in Japan began to show signs of gradual exhaustion.

	Total production
1912	1,458,290
1913	1,693,582
1914	2,307,435

Total production

1915	2,563,359
1916	2,592,707
1917	2,508,943
1918	2,142,589
1919	1,963,561
1920	1,950,172
1921	1,961,068
1922	1,809,497
1923	1,589,923

	Production					Consumption	
	Naphtha	Lamp Oil	Light Oil	Heavy Oil	Machine Oil	Total	
1912	23,445	2,148,950	1,177,670	1,368,925	806,870	5,525,860	12,216,248
1913	110,185	2,716,510	1,262,925	1,225,675	896,275	6,211,570	11,852,780
1914	128,680	2,900,100	1,964,935	1,998,990	1,183,920	8,230,625	12,509,963
1915	235,625	2,650,680	2,668,025	3,706,275	1,317,710	10,578,315	14,866,091
1916	384,050	2,658,050	2,223,890	3,943,785	1,184,375	10,394,150	12,722,124
1917	627,110	2,280,860	3,077,760	2,749,135	1,788,330	10,523,195	12,674,910
1918	736,130	1,542,860	3,570,620	1,663,585	1,749,380	9,262,575	12,274,226
1919	742,040	1,220,700	2,902,750	994,475	1,882,625	7,742,590	12,122,325
1920	787,265	999,305	2,855,654	925,785	1,854,640	7,422,649	12,485,783
1921	706,415	716,335	3,493,505	521,625	2,138,595	7,576,475	12,367,283
1922	653,486	758,250	2,712,793	585,348	1,278,495	5,997,372	13,716,881
1923	725,995	645,455	2,721,930	716,445	1,429,520	6,239,345	13,390,605

Unit a barrel.

These figures include crude oils that were imported and refined in the country.

By the conclusion of an agreement between Soviet authorities and the Tokyo government regarding the development of oil and mineral resources in Saghalien Island which took place in December of 1925 the future of oil situation in Japan was made a little brighter than ever. An oil company with a capital of 10,000,000 yen was organized by Tokyo magnates and the development has been commenced in the Island.

If this proves successful and Japan can obtain abundant supply of oil from this source, one of her gravest questions—the shortage of oil and iron—may be solved satisfactorily. Otherwise, she must suffer from ever increasing imports of foreign oils.

ELECTRIC ENTERPRISES.

Electric business in Japan has made a striking progress in recent years. Especially the fact that Japan is a mountainous country and has abundant water sources has induced the development in hydro-electric undertakings. So far as electric light is concerned, there is perhaps not a single town or village of larger size that is not lighted with electric lamp. The electricity, which has virtually taken the place of kerosene lamp as a principal means of lighting, has also greatly encroached upon the regions of manual and machinery works.

In the early period of electric enterprises in Japan, the use of electricity was almost confined to electric light. But gradually the tendency to apply electric power to small household industries developed. Then printing offices, rice-cleaning business, ice-manufacturing business and various other machine industries learned to employ electricity as their motive power. This led to the establishment of electric plants of which sole business is to supply electric power instead of carrying on electric light service.

The grand work of the construction of the powerful hydro-electric station at Katsura River in Yamanashi prefecture was begun in January of 1906 which is now supplying the city of Tokyo with electricity from a distance of 50 miles. This was the forerunner of the establishment of big water power plants in the country. The water power stations at Kinu River in Tochigi prefecture, at various parts of Kyushu, at Uji River in Kyoto, and at Inashiro Lake in Fukushima prefecture are the erection of later dates.

Since water power began to play an important part in the electric business in the country, the steam-boiler system has gradually lost ground, which will be seen in the following table.

	WATER POWER		STEAM POWER	
	Capital invested Yen.	Generating capacity	Capital invested Yen.	Generating capacity
1906	19,520,200	12,960	20,503,750	25,837
1907	20,292,453	23,416	36,375,750	29,466
1908	47,499,221	41,126	13,598,259	35,386
1909	56,344,984	53,561	18,060,442	36,860
1910	95,586,784	73,591	28,564,237	52,140
1911	110,210,852	103,414	29,098,942	59,530

WATER POWER		STEAM POWER	
Capital Invested Yen.	Generating capacity	Capital Invested Yen.	Generating capacity
1912 ..	125,396,615	178,035	42,812,017
1913 ..	188,408,624	252,157	36,225,406
1914 ..	260,305,318	326,575	16,606,909
1915 ..	274,942,898	339,735	16,408,608
1916 ..	282,150,014	347,827	17,309,941
1917 ..	314,465,081	478,329	22,984,196
1918 ..	335,612,405	425,253	21,534,990

In 1912, there were 521 electric plants in Japan, of which 445 were electric light and power stations, 33 were tramway companies, and the remaining 43 carried on both the supplying of electricity and tramway services. During ensuing years the figures increased so much that at the end of 1924 as many as 5,312 plants, inclusive of those owned privately and by government offices, were in actual operation.

Among others the following are the most distinguished electric companies existing in Japan.

Denomination	Capital
Teikoku Dento	Y. 57,360,000
Kinugawa Water Power ..	Y. 45,000,000
Keihin Electric Power ..	Y. 32,000,000
Fuji Water Power	Y. 34,860,000
Ujigawa Denki	Y. 85,000,000
Daido Electric Power ..	Y. 112,963,000
Nihon Electric Power ..	Y. 50,000,000
Tokyo Dento	Y. 258,000,000
Toho Electric Power ..	Y. 139,821,000
Kyushu Water Power ..	Y. 80,000,000

The above survey is naturally incomplete and cannot include, for want of space, a statement of the whole development of Japan during the Taisho Era, but it is sufficient to give a definite impression of the character of the period.

The State of China

By Silas H. Strawn

An Address Delivered at the Meeting of the Industrial and Commercial Clubs of Chicago

I WENT to China under instructions from the Secretary of State to do everything possible to carry out the letter and spirit of the Washington Treaty respecting the Chinese Customs Tariff and the Resolution constituting the Commission to inquire into Extraterritorial Jurisdiction in China.

It was my duty to investigate facts. I had no job to preserve; no ambition to promote and no propaganda to spread or to fortify. I assumed I was the representative not of one group of our citizens, but of our Country. Therefore, when I talk about China I must deal with conditions I saw there,—conditions as they are and not as we wish they might be. I went in a spirit of sympathy and helpfulness toward the Chinese people, which has always been consistent with the policy of the United States.

He does the Chinese people a great injustice who bases his judgment of conditions obtaining in China on propaganda which has been spread throughout the world for a number of years, or upon such information as he may be able to get by a short visit to China as a tourist.

Perhaps you may get a better idea of the situation and of the difficulties with which we had to contend if I tell you that China is larger than the United States, Mexico and Central America combined. It is larger than all Europe. More than four hundred millions, or one-fourth of the people of the earth, live in China. As nearly as can be, it is estimated that 97 per cent. of the Chinese can neither read nor write, even in the Chinese language. By that I do not mean that the Chinese are stupid or of a low order of intelligence. The great mass have no educational opportunities.

There are many different dialects. The Cantonese coolie cannot converse with the Pekinese except in pidgin English.

China has all of the extremes of climate. It is cold and dry in the desert north and hot and damp in the tropical south. It has a great variety of natural resources. There are comparatively few industries. The great mass of people live by tilling the soil.

There are 7,000 miles of railroad in China compared with 265,000 in the United States. The tonnage available for transportation is large. On account of cheap labor, the operating ratio of the Chinese railroads to their earnings is less than that of any other country. Instead of the earnings of the railroads going first to the payment of employees and for operating expenses, then the net to the owners, in China all of the earnings of the railroads are confiscated by the warlords. In September, 1925, the Chinese Minister of Communications in his official report to the

Chief Executive stated that more than 180 millions of dollars or, with interest, more than 250 millions, of the earnings of the Chinese railroads had been taken by the militarists since the foundation of the Republic,—thirteen years.

Every railroad in China is now controlled by the military. When the equipment is not being used for the movement and billeting of troops its use is sold by the warlords to the unfortunate shippers at outrageous rates. The usual "squeeze" for the use of a freight car is \$5, per ton, in addition to the freight rate. Thus, to obtain the service of a 40-ton car from Tientsin to Peking, a distance of about 90 miles, the shipper is held up for \$200, plus the regular rate.

The American Legation in Peking last summer arranged to buy its winter supply of coal from a mine about 20 miles from Peking. The dominant warlord, or his underlings, demanded a "squeeze" of \$2. per ton for the cars to move the coal; in addition, the Legation must pay the warlord \$25. per car, and the village through which the coal must pass \$1.80 per car. More aggravating is this episode when it is known that the cars and locomotives to move the coal had been furnished to the Chinese Government by American builders and they have not as yet been paid for, the debt being several years in default. The unfortunate vendors have no lien on the equipment and could not enforce it if they had.

When I left China I was reliably informed that one of the warlords was collecting from the Peking-Hankow Railroad \$1,000,000 per month, the entire earnings of the railroad being \$1,500,000 per month, and its payroll \$650,000. It is therefore obvious that the employees could not be paid, and they had not been for several months. Another dominant warlord was receiving the revenue of the Peking-Mukden Railroad which runs from Peking to Mukden.

No attention is paid to maintenance of way or equipment. Thus, all the equipment is rapidly becoming useless because of lack of repairs. Loans upon the railroads are defaulting as rapidly as they mature. Unless conditions soon change it is inevitable that it will not be long before the railroads of China must cease to operate and the unfortunate people will be compelled to go back to the barrow or to pack their freight upon their backs. Most of the camels, donkeys and cattle of the patient, industrious farmers have already been taken by the soldiers.

There are no highways in China and few automobiles. There are about 8,000 motors in all China against 20,000,000 in the United States.

The Government

For thousands of years China has been an absolute monarchy. On October 9, 1911 a bomb exploded in a Chinese home in the Russian Concession in Hankow. This was the beginning of a revolution which resulted in the abdication of the Manchu Dynasty on February 13, 1912. The revolutionists issued a manifesto more eloquent in denunciation of the oppression of the Manchus than was our Declaration of Independence in denouncing the treatment of us by King George III.

Many patriotic, well educated, intelligent Chinese have been and are doing their best to establish a Republic with a stable Government. But they have met with little success in the face of the continuing wars carried on by warlords who are actuated by but two motives,—greed and aggrandizement.

It would be unreasonable to expect any people, much less those of a country so vast in area, so numerous in population, so without means of communication, and so illiterate as the Chinese, to evolve a republic along occidental lines within the short space of fourteen years. To-day we cannot regard China as a republic in anything more than name.

As indicative of the instability of the Chinese Government, I may mention that since the attempt to establish a Republic fourteen years ago, there have been eight presidents or Chief Executives; forty-two Cabinets with a continuously changing membership; and twenty-five Ministers of Justice.

The last President, Tsao Kun, was locked up in Peking from December, 1924 to April, 1926, because it was said he bought his office. Yet no formal charge was ever made against him and he was never brought to trial. He was released when the armies of Wu Pei-fu and Chang Tso-lin entered Peking on April 10, 1926. On that day the Chief Executive, Tuan Chi-jui, fled from the presidential mansion to the foreign Legation quarter in Peking and thence to a foreign concession in Tientsin where he now resides. Two other Presidents of the Chinese Republic preceded him to that asylum. In China it is a capital offense to differ politically so that when an opponent gets control of the governmental machinery, or a hostile military leader appears, it behooves officials to get within the protection of a foreign concession if they desire to live.

In addition to the three former Chief Executives now living in Tientsin, there are said to be living there 26 former Tupans or Governors of the several Provinces, and a large number of other high officials who have either incurred the wrath of their political opponents or are charged with having too generously helped themselves from the public treasury.

Since April 10, 1926, there has been no Government in China. The authority of the Central Government is gone. No regard is paid to the orders or wishes of the so-called "Regency" Cabinet which is assuming to function as a Government. The entire country is over-run by soldiers and bandits. Foreign Legations are unable to secure any redress from the Central Government for wrongs done to their nationals in any part of China. Provincial officials hold the Central Government and its orders in contempt. Long past due obligations, foreign and domestic, for money borrowed and for materials furnished to operate the railroads and public utilities give the Central Government little or no concern. The officials, who are the mere puppets of the warlords, are interested solely in devising ways and means of increasing the loans and raising funds to meet the requirements of their masters.

Outrageous internal taxes of every conceivable kind are levied upon merchants and tradesmen, the revenue from which does not go to the support or maintenance of the civil functions of the Government, but to the military. The officials remain unpaid.

The only departments of the Government that are capably and economically administered and in an orderly and business-like manner, are the post office, the Maritime Customs and the Salt administration, which are under the control of foreign employees.

No Chinese citizen dares protest or attempt to do anything to bring order out of the chaos that obtains. Every newspaper article which escapes the censor and which may be regarded as a criticism of the dominant warlord or his underlings, subjects the editor to the peril of summary execution without even the pretense of a trial.

I have stated a few of these facts that you may have some idea of the difficulties confronting the foreign Powers in their efforts to do something for the patient, industrious and long-suffering Chinese people.

In China we hear much of the sovereign rights of the Chinese Republic. The Chinese politicians do not seem to be interested in the rights of the people.

The Tariff Conference

As I have stated before, one of the Treaties concluded at the Washington Conference on February 6, 1922, related to the Chinese Customs Tariff. That Treaty provided that immediate steps should be taken for a Special Conference to prepare the way for the speedy abolition of *likin* and for the fulfillment of certain other conditions laid down in the Treaty of September 5, 1922, between Great Britain and China, and in the Treaty dated October 8, 1903, between the United States and China, and one of the same date between Japan and China, with a view to levying the surtaxes provided for in those treaties.

It was provided that the Conference should be composed of two representatives of each of the Signatory Powers, and of such other Powers as might desire to participate. The Conference should meet in China within three months after the coming into force of the Treaty of February 6, 1922, on a day and at a place to be designated by the Chinese Government.

The Treaty provided that the Special Conference should consider interim provisions to be applied prior to the abolition of *likin* and the fulfillment of the other conditions laid down in the articles of the treaties, and that the Conference should also authorize the levying of a surtax upon dutiable imports as from such date, for such purposes and subject to such conditions as it might determine. The surtax should be at a uniform rate of 2½ per cent. *ad valorem*, provided that in case of certain articles of luxury, the rate might be increased up to 5 per cent.

"*Likin* is a tax imposed upon goods in inland transit. It was originally levied to meet the additional expenditures caused by the Taiping Rebellion. It was first imposed in 1853 upon goods while in transit from one province to another, or from one district to another in the same province. When the Taiping and Mohammedan Rebellions were in progress the tax was extended throughout the whole country. *Likin* stations or barriers, are placed along the main routes of commerce, both by land and water, sometimes at intervals of less than 20 miles. Although there is in existence an official tariff, it is practically ignored by both officials and traders to allow for "squeeze."

In the Mackay Treaty with Great Britain in 1902 the Chinese Government recognized that the system of levying *likin* and other internal taxes upon goods in transit and at destination impeded the free circulation of commodities and undertook to discard the system.

After the adoption of the Treaty of February 6, 1922 and before it was ratified by all of the Powers, a controversy arose between China and France over the payment by China of the French Boxer Indemnity. China insisted that she had a right to pay it in the depreciated paper francs while France insisted that it should be paid in gold francs. This controversy was not settled until the Spring of 1925, whereupon the Chinese called the Conference. Mr. John Van Antwerp MacMurray, the American Minister to China, and I were named as the Delegates representing the United States. There were thirteen Powers represented at the Conference which convened on October 26, 1925 in Peking.

At the time of the calling of the Conference war conditions in China were comparatively quiet. Tuan Chi-jui was acting as Chief Executive pursuant to an agreement between Feng Yuxiang and Chang Tso-lin. When the foreign Delegates were enroute to China, Feng and Chang began to quarrel, the former, known as the "Christian General," accused Chang of being a traitor to his country because of his alleged relations with Japan, while Chang accused Feng of being "red" because of his relations with Soviet Russia. Fighting began and continued with Peking and the control of the Central Government as the objective and the national treasury, as the stake, until Chang, coalescing with Wu Pei-fu, succeeded in compelling the withdrawal of Feng and his army from Peking on April 10, 1926. Since then, as I have stated, there has been no Central Government in China.

Fighting continued along the right of way of the railroad between Peking and Tientsin, cutting Peking off from all rail communications with the outside world for three weeks in December, 1925, and for a similar period in March and April, 1926.

When the Tariff Conference was called China was represented by 10 Commissioners and Delegates Plenipotentiary. When Feng and Chang began to fight it was necessary for the Chang men on the Delegation to flee to the foreign concessions at Tientsin. This they did shortly after the Conference began. One by one the Chinese Delegates, including the Chairman of the Conference, fled, so that on the day of the *coup d'état*, April 10, 1926, there remained but three of the Chinese Delegates. These gentlemen were not so definitely aligned in politics as to necessitate their flight. But by reason of the shift of power from Feng to Chang and Wu the remaining Delegates were bereft of their authority.

After patiently waiting for months for the Chinese to establish a Government in order that the Tariff Conference might continue, the Delegates of the foreign Powers met on July 3rd, and issued a statement that they were earnestly desirous of continuing the work of the Conference at the earliest possible moment the Delegates of the Chinese Government were in a position to resume with the foreign Delegates the discussion of the problems before the Conference. When I left Peking, September 16, 1926, there was little hope of the Conference having another meeting in the near future because there were no representatives of a Central Government in China with whom to confer.

At the beginning of the Conference the American Delegation, followed by the Delegations of the other nations, proposed immediately to implement the Washington Treaty, which it is estimated would increase China's revenue by \$30,000,000 per year. The Chinese Delegation refused to accept the offer because the Chairman said if they accepted that proposition the foreign Delegates would "run out" on them, and would not give them additional tariff to yield a total revenue of \$100,000,000 per year, which the Chinese insisted they required.

The Powers, on the initiative of the American Delegation, countered this suggestion by offering not only to give China the surtaxes provided in the Washington Treaty but also to begin immediately the negotiation of a new Treaty which would give China all the additional revenue the traffic would bear. Obviously, if the tariff were too high there would be no trade and consequently no revenue.

Notwithstanding Peking was continuously the vortex of military activity and the disappearance of the Chinese Delegates, the foreign Delegates persisted in their efforts to frame a tariff schedule which would yield enough revenue to enable China to start on the abolition of *likin*, to consolidate her debts and to have something left for administrative and constructive purposes. There was no substantial difference among the Powers and their technical advisers came practically to an agreement with the Chinese technical advisers upon a tariff schedule. The work cannot be completed because there is no Chinese Government, as above stated. Humorous as it may seem, instead of the foreign Delegates "running out" on the Chinese, the Chinese Delegates, including the distinguished Chairman, "ran out" on us.

The Extraterritoriality Commission

Extraterritoriality is the exemption of a foreigner from the operation of the local law of a country he may visit. It is granted either by usage or treaty on account of difference in law, custom and social habits among nations.

Resolution No. V adopted on December 10, 1921, at the Washington Conference provided for the establishment of a Commission by the United States, the British Empire, Belgium, France, Denmark, Italy, Japan, the Netherlands, Norway, Portugal, Spain and Sweden, to which each of the Powers should appoint one member to inquire into the present practice of extraterritorial jurisdiction in China and into the laws and judicial system and the methods of judicial administration in China, with a view to reporting to the Governments of the several Powers their finds of fact in regard to these matters and their recommendations as to such means as they might find suitable to improve the existing conditions of the administration of justice in China and to assist and further the efforts of the Chinese Government to effect such legislation and judicial reforms as would warrant the several Powers in relinquishing their respective rights of extraterritoriality either progressively or otherwise. China also was represented on the Commission by a very able Chinese lawyer and jurist.

The extraterritorial rights of the several Powers in China are based upon treaties, the first of which was that of Great Britain in 1843, and that of the United States in 1844, followed by the other nations from time to time, until the last, a treaty with Switzerland negotiated in 1918.

For many years the Chinese have insisted that the exercise of extraterritorial rights in their country impinged their sovereign dignity, that those rights should be surrendered, and that China was coerced into the making of the extraterritorial treaties by the foreign Powers. The absurdity of this charge will appear when we reflect upon the strength of the Swiss navy—Switzerland's Treaty, as just stated, was concluded in 1918.

Great Britain by Treaty of September, 1902, the United States and Japan by their treaties of October, 1903, each agreed to give every assistance toward the attainment by the Chinese Government of its desire to reform its judicial system and to bring it into accord with that of the Western nations. These three nations in these treaties also declared that they were prepared to relinquish their extraterritorial rights when satisfied that the state of the Chinese laws, the arrangements for their administration and other considerations warranted them in so doing.

China requested that the Commission meet in Peking on December 18, 1925, but on account of fighting along the line of the railroad from Peking and Tientsin, it was impossible for some of the Commissioners to reach Peking in time for the meeting. Accordingly, the Commission held its first meeting on January 12, 1926, and thereafter continued to investigate the subject. It completed its work with the report signed by all the Commissioners, on September 16, 1926.

The Commissioner of the United States was Chairman of the Commission and was exceedingly gratified to have the Commissioners of the thirteen nations, including the Chinese, agree upon the recommendations and sign the report. Pursuant to agreement entered into at Peking, the report is not to be made public until it has reached the seats of the several Governments. I assume that that will be within a very few days.

Inasmuch as it was the duty of the Commissioners to find and report facts respecting the exercise of extraterritorial jurisdiction in China and the administration of justice there, I commend this report to your consideration, believing it will tend to correct much misinformation that has been published in this country on the subject of extraterritorial jurisdiction in China.

China's Grievances

Let me briefly refer to some of China's complaints.

"*Unequal Treaties*"—This is understood to embrace four general grievances of the Chinese politicians: (1) Foreign concessions and settlements; (2) Customs; (3) Customs Service; and (4) Extraterritoriality.

(1) *Foreign Concessions* had their origin in a desire on the part of the Chinese to segregate the foreigners from the Chinese people. Belgium has one concession; France four; Great Britain five; Italy one and Japan two. These concessions are located at New-chang, Tientsin, Shanghai, Chinkiang, Hankow and Canton. Speaking generally, a concession is a settlement of which the Consul of the country to whom the grant is originally ceded is the local overlord, responsible only to his Minister in Peking and to his home Government, although the work of administering the concession may be delegated to a municipal council.

Settlements.—There are two foreign settlements, one at Shanghai and the other at Amoy. The settlement functions under the control of the Consuls of all the nationalities having an interest in the settlement who on their part are responsible to the Diplomatic Corps in Peking.

The territories set aside, particularly at Tientsin and Shanghai, the most important concessions and settlements, were swampy, poor lands, but under foreign control they have grown to be the most attractive spots in China. So attractive are they that a very large percentage of the population of the Shanghai settlement is Chinese.

A charge is that the concession and settlements ought to be receded because a wicked Chinese may run in there for asylum. I do not believe any of the Powers would refuse, on a proper demand, to surrender any wicked Chinese who sought asylum in its

concession. It may well be that under the principles of international law the Powers might refuse to surrender a Chinese citizen who had been unfortunate enough merely to differ politically from his pursuer. For humanity's sake the foreign Power might well refuse to be *particeps criminis* in contributing to the inevitable fate which would befall such an unfortunate Chinese citizen.

The Chinese politicians desire to have these concessions retroceded to China. Their retrocession is a political question of which the Extraterritoriality Commission declined to take jurisdiction as not within the scope of the Resolution constituting the Commission. The foreigners and, I believe, the thoughtful Chinese residing in the foreign Concessions and Settlements will vigorously oppose any retrocession because they know that these concessions and settlements, when returned to the Chinese would rapidly be disintegrated and destroyed. Foreigners would lose all their property and the Chinese who have moved into the settlements and concessions would be subjected to the levy of the outrageous Chinese taxes which they escape in the foreign settlements.

As evidence of what would happen were the concessions returned to the Chinese, I cite the case of the concessions surrendered by the Austrians and Germans in Tientsin and particularly Tsingtao which was taken over from the Japanese on the surrender of Shantung. As to Tsingtao, I quote from a recent newspaper article published in China:

"Wharves and godowns are badly out of repair, the Strand Beach is desecrated with low class cabarets. Troops of none too pleasing manner wander everywhere. The flies are pestilential, and worst of all, the beautiful woods which were the glory of Tsingtao are disappearing wholesale * * * For a few months in 1924 Tsingtao appeared to be doing well under "Iron Head" Kao En Hung but he was thrown out (with great treachery by the way) when Wu Pei-fu went down in the wars of that autumn. Mr. D. Y. Lin, formerly superintendent of the forests in Tsingtao is an absolute expert and enthusiast in his job. He, too, was thrown out some little time ago, but we believe he is back again now. But he is powerless before the soldiers. The fate of the woods must be heartrending to him. It is only about 3½ years since Tsingtao was handed back to China as a fine going concern and that is what the lords of misrule have done with it for her."

(2) *Customs.* The Chinese politicians for many years have complained that they could not revise their Customs Tariff without the unanimous consent of all the Powers with whom they had treaties. Had the Special Conference on Chinese Customs Tariff been carried to a conclusion that criticism would have been entirely removed because it was the repeatedly expressed intention of the foreign Powers to agree upon a tariff schedule which would give China all of the tariff the traffic would bear. They also agreed to include in a Treaty to be evolved at the Conference a provision, among others, that China should have complete tariff autonomy on January 1, 1929, China at the same time agreeing that she would abolish *likin* on that date. As above indicated, it is no fault of the Powers that the Conference was not concluded and China did not realize her desire.

The Chinese agitators also complain that the administration of the Chinese Maritime Customs is under a foreign Inspector-General and they clamor for his dismissal, asserting that the revenue is seized and subverted to the uses of the foreign imperialistic Powers. This assertion has no foundation in fact. In 1859 the Customs at some of the treaty ports then open to foreign trade came under the temporary supervision of the foreign Powers for the collection of war indemnity which the Imperial Government could not pay in cash. When the indemnity had been collected the Imperial Government was surprised at the alacrity with which so large an amount had been received from foreign trade and the Government invited the temporary foreign supervisors to continue the collection of the revenue which condition has obtained thence hitherto.

A large part of China's indebtedness is secured by the Customs. They have been able to place loans upon this security because the creditors, both foreign and domestic, had confidence in the stability of the Customs so long as a foreigner was Inspector-General and had control of the funds. Everyone who has made even a casual study of China's financial situation knows that the foreign Inspector-General of Customs is the only anchor between order and absolute financial chaos in China. There is no Chinese or group

of Chinese, however strong and well-intentioned they might be, who could withstand the importunities of their friends, or resist the bayonet of the warlords, if the Customs funds were taken from the control of the foreign Inspector-General and placed in the hands of Chinese officials.

If and when that should occur, considering conditions in China as they now exist, the security back of the loans would be gone and the creditors of China who now rely upon the Customs security would be in the same hopeless situation, as are China's unsecured creditors. It is incomprehensible to believe that any thoughtful Chinese citizen wishes to have that condition brought about.

Arms and Munitions.—We also hear the complaint that the foreign Powers furnish the Chinese with arms and munitions, and that thereby the warlords are able to carry on their useless wars.

In May, 1919, certain of the Powers, including the United States, entered into an agreement whereby they undertook to restrain their nationals from exporting or importing into China war materials until there should be established in China a Government whose authority should be recognized throughout the whole of China. It is believed that the Powers generally have lived up to the letter and spirit of that agreement. This agreement, however, does not effectively protect the Chinese against themselves. In 1925 General Feng Yu-hsiang entered into an agreement with agents at Moscow by which he was able to import very large supplies of munitions by motor truck from Siberia through Urga. I was advised that when importations into China of Arms or war material are attempted they are seized by the Customs and confiscated as contraband. That, thereupon, the dominant warlord seizes the shipment for his use. This, it may be that the Chinese people are powerless to prevent the importation of arms of the seizure thereof by the warlords but this is a situation which should be charged to the foreign Powers.

It would be very difficult for the foreign Powers to police so vast a country as China against the acquisition of war material. I submit the Chinese should do that police duty themselves.

One of the big world problems is,—what can the other nations do to help rescue the Chinese people from the enslavement of the warlords and to bring order out of the existing chaos? As I stated on a previous occasion, he who could prescribe a cure for all the ills of China would be the greatest pathologist the world has seen. In the solution of this problem, as in that of any other difficult question, we must commence with a knowledge of *facts* and not rely upon false premises if we hope to arrive at an accurate solution.

During my eleven months' residence in Peking I came to have an affectionate regard to many of those who were trying to carry on a Government in the face of insuperable difficulties. I have a most sympathetic consideration for the great mass of the Chinese people who are impoverished and enslaved by the warlords.

Obviously, our trade, as well as that of the other nations, with China cannot be increased or even maintained on its present basis until there is peace, so that the frugal, industrious and patient Chinese people may enjoy the fruits of their labor rather than be continuously robbed by bandits and soldiers.

The attitude of the United States toward China always has been helpful and sympathetic. Conditions in China change so rapidly it would seem impossible for our Government to announce in advance any definite policy which could meet the changing conditions.

The United States and the other Powers have done everything that could be done to carry out the letter and spirit of the Washington Treaty respecting the Tariff and the Resolution respecting extraterritoriality. The work of the Extraterritoriality Commission is completed, that of the Tariff Conference is unfinished, not because of any failure on the part of the foreign Powers but because of the conditions in China which I have attempted to describe.

The President and Secretary of State are entirely sympathetic with our creditors in their efforts to collect long past due debts from the Chinese Government and also with the interests of our merchants and manufacturers who are desirous of promoting trade with the Chinese. The responsibility of our relations with China rests primarily upon the President and the Secretary of State. I have an abiding confidence in their ability and willingness to discharge that duty wisely and well.

Bombay Textiles

A Second Communication has been Addressed to the Indian Tariff Board by the Japanese Cotton Spinners Association

Canada Building, Hornby Road,
Bombay, October 30, 1926.

THE SECRETARY,

INDIAN TARIFF BOARD,

(Cotton Textile Industry Enquiry) Town Hall, Fort, Bombay.

SIR,—I consider it a privilege to be allowed the opportunity of a final reply and I deem it my first duty to express my warm gratitude to the Board for this courtesy. A close study of the evidence tendered before the Board leads me to believe that the Mill-owners have failed to substantiate their case and, therefore, there remains very little to be said on the subject. There is one aspect, however, of the Mill-owners' evidence which deserves particular notice and that is the amazing inconsistency displayed from end to end. This inconsistency is strikingly demonstrated in their general attitude towards the whole subject. In one of a recent series of Press articles by the Bombay Mill-owners' Association, the Cotton Excise Duty was proclaimed as politically, economically and above all, morally indefensible. Said they "At the bidding of Lancashire the peasant of India has had to pay more for his clothing for many years because, although it is made in his own country, it is subject to an Excise Duty. The better classes, who wear Lancashire products, have gained the benefit because the import duties have been unduly low." The Mill-owners here reveal grave concern for the down-trodden ryot who are compelled to pay a high price for their coarse cloth so that the wealthy class may be able to buy fine Lancashire cloth at a cheap price. This grievous wrong to the poor and this scandalous iniquity was intolerable and they set about to redress this historic wrong. To their great and lasting credit they succeeded in getting the Excise Duty abolished. It is sad to reflect, however, that the bright side of the picture ends here; for what do the Mill-owners propose to do now? Having righted a wrong, they are bent upon perpetrating a greater wrong as is evidenced in their reply to the Board's special question No. 1. They say:—"The Association considers that a heavy duty should be levied on coarse goods and lower counts of yarn, a moderate duty on medium classes of goods and a low rate of duty on higher counts." Well may the under-fed and under-clothed ryot say "Save us from our erstwhile champions."

I have no desire to dwell on other glaring inconsistencies; nor do I propose to take notice of the many ungenerous remarks made against my country; much less have I any desire to retaliate by holding up to ridicule various aspects of mill-management in India. Enough has been said on the subject and far be it from my purpose to enlarge upon it. The cause of the Association which I have the honour to represent rests not upon the vilification of its opponents, but upon the solid foundation of Truth; and having the profoundest confidence in the Board's sense of justice I cannot do better than to entrust my case to their care, contenting myself merely with a short statement of facts and figures regarding the nature and extent of Japanese competition and a few general remarks by way of criticism and suggestion. Part I deals with the former, and Part II with the latter.

PART I.

1.—A glance at table I will reveal that out of a total Indian Mill production of 1,930,000,000 Yards (1924-1925), coloured goods (marked A) comprise 30 per cent. and grey and Bleached goods (marked B) 70 per cent. It is unfortunate that separate figures for grey and bleached are not available—but probably the production of bleached goods does not exceed 20 per cent.

2.—In coloured goods, the range of competition between Indian production and foreign imports is not very extensive. In any case, the competition from Japan is nil and from the United Kingdom there is not very much. There is, however, increased competition in coloured goods from Continental countries like Italy, Belgium, Holland, etc.

3.—Let us now examine the extent of competition in bleached goods between local production and imported goods. Here also Japanese competition is practically absent so that in bleached and coloured goods (which form about 50 per cent. of Indian production) there is no competition from this country. As regards competition between local goods and imports of bleached shirtings and dhoties from United Kingdom we trust the Board will have means of determining the extent of it.

4.—Passing on to grey goods it is obvious from the table that there is somewhat more competition in this class. Indian grey production may be classified into seven groups: *c, d, e, f, g, h, i*, and we shall examine each separately.

(c) KHADDAR: which represents about 4½ per cent. of the total Indian production is largely made from 10s. and under. There is no competition in this cloth from any foreign country but there is internal competition between the Mills and the hand-loom industry, to the grave detriment of the latter.

(d) DRILLS AND JEANS: (4 per cent.) These are made of 16s. and under and imports from Japan for 1924-25 are about 22 per cent. of the Indian production of Drills. There are, principally, two qualities imported from Japan (1) "Two Swans" and (2) "Elephant" Brand. Their dimensions, weight and market prices are as under:—

- (1) 29" × 40 Yards × 13½ lbs. @ Rs. 12/12 per piece duty paid.
- (2) 29" × 40 Yards × 14 lbs. @ Rs. 14/14 " " "

Similar qualities of Drills are being sold by the Indian Mills at 12 and 13 annas per lb. respectively. It may be added that imports of Japanese Drills have gradually diminished since 1925 and there has been a further marked falling off since the repeal of the Excise Duty. (Evidence is furnished by figures of imports during January/July, 1926 as shown in Table II.)

(e) T CLOTHS, DOMESTICS AND SHEETINGS:—(About 4 per cent.). These goods are largely made from 16s. and under, and here again Japanese imports are nearly 34½ million yards or nearly 44 per cent. of Indian production. Three styles of Sheetings are imported from Japan, viz:

- 36" × 30 Yards × 10 lbs.
- 36" × 40 Yards × 13½ lbs.
- 36" × 40 Yards × 16 to 17 lbs.

The last two styles are consumed almost entirely in India, but they form only one-fifth of the imports: four-fifths of the imports are of the 10 lbs. variety and a major portion of this is re-exported to Persian Gulf, Mesopotamia, East Africa and various other markets. (Japan has started direct service from Kobe to Mombassa only recently). It may be added that as in the case of Drills, imports of Sheetings have fallen off very considerably since the last year or so and more especially after the repeal of the Excise Duty. (Vide Table II). Japanese Sheetings are imported to-day (into Bombay) almost wholly for re-export to such ports as are not served direct by Japanese Steamship Companies. Internal consumption has fallen off almost completely (even in the heavy weight varieties) as prices do not compare favourably with Indian production. Bombay Mills are now selling at 11½ to 12 annas per lb. whereas prices for Japanese qualities are as under:—

- Dragon C or 9 Dragons 39" × 30 Yds. × 10 lbs. Rs. 8/8 without duty.
- "Locomotive" No. 6,000 36" × 40 Yds. × 16 lbs. Rs. 15/10 with duty.
- "Sunface" AAA 36" × 40 Yds. × 17 lbs. Rs. 19/- with duty (per piece).

It will be observed that 11 per cent. import duty is an effective barrier not only against the heavy variety but even against the 10 lbs. qualities in which competition is alleged to be very severe. Japan, therefore, cannot compete with India in Sheetings in the Home market but she is better able to compete in the export trade

as India and Japan are subjected to the same duties in foreign markets. (Incidentally it may be mentioned that imports of such popular qualities as "Locomotive" No. 6000 have fallen off from 2,500 bales a year to under 200 bales during the current year. The same is the case with the 13½ and 17 lbs. varieties. Figures could be easily had from the Customs in support of this statement). We take it, therefore, that the Board will be sufficiently convinced that there cannot possibly be any competition in Sheetings in the Home Market. As regards Japanese competition in the export markets the Mill-owners' Association do not appear to know their own mind as is evidenced by their self-contradictory statements. In one place they lay great emphasis on the point that Japan has ousted Indian trade from East Africa. In another place they attribute it to entirely different factors. We reproduce their own words: "During that particular year (1922) they made the rupee a florin in East Africa. . . . that was the cause which ruined Indian trade there." And again "About that time specific duties were imposed which specially penalised Indian goods and favourably treated English goods. It considerably 'handicapped us.' Further comment is needless. But there is one very important fact which we are anxious to bring to light. Japanese export trade in Sheetings to Arabia and Africa has been also showing a considerable decline recently and manufacturers in Japan are growing very anxious indeed. American competition (and Belgium and Austrian competition to a smaller extent) is growing in intensity and severity and Japanese Sheetings are suffering a serious setback in the Arabian and East African markets. With the huge American cotton crop this year the competition from this country is sure to increase and the prospects of Japanese export trade in Sheetings are none too rosy. Italy has raised a tariff wall against foreign goods imported into her African territory and Japanese Sheetings like other foreign goods have been shut out there. The imposition of specific duties as also the conversion of the rupee into florin in East Africa have also hit Japan quite as badly as Indian Mills. In support of the above statements we beg to refer the Board to the Report on the Trade and Commerce of East Africa (upto September, 1925) by Mr. C. Kemp, Deputy Trade Commissioner. We shall here reproduce only one paragraph. "In the unbleached trade note should be taken of the decreased share of Japan mainly owing to the appreciation of the rupee exchange at a time when the pound sterling was approaching parity with the dollar, and so furnishing an opportunity of increased imports from the United States of America, but also in some small measure due to a change in fashion and an increased demand for lighter weights."

(f) There is no foreign competition in this group.

(g) There is no foreign competition in this group.

(h) There is no competition at all from Japan in Dhoties.

As a matter of fact Japanese Mills have no machinery for Dobby borders. A glance at Table I will show that Dhoties are imported from the United Kingdom in enormous quantities, the imports of grey Dhoties alone being considerably more than four times the total imports of Japanese Grey, Bleached and Coloured goods taken together. It is not for us, but for the Board to determine, to what extent, if any, they compete with Indian production.

(1) SHIRTINGS AND LONG-CLOTHS: (27 per cent.) More than three-fourths of the Indian production consists of 24s. and under, the remainder being made up chiefly of 24s. to 30s. The great bulk of the imports from Japan are of 40s. and upwards. So far as competition with Indian goods is concerned, hardly 10 per cent. of Japanese Shirtings come into direct conflict. And these are all of one style, viz: 36" × 40 yards × 12 lbs. They are made up of 22s. or 24s. warp and weft; but Japan is rapidly losing ground to Indian Mills in this class as in other coarser grades and we believe that within six months Japanese 12 lbs. long-cloths will practically cease to be imported. Market prices of a few qualities are given below:—

36" × 40 yards × 12 lbs. Long-cloths.

	per piece with duty
"Standard Bearer" No. 1000	Rs. 14/12
"No. 7070"	14/14
"Lion AAAA"	141/2
"Asahi"	14/4
"Snipe" (or Two Birds)	14/8
"Elephant and Fish" No. 2500	15/-

Local Mills are selling similar qualities at Rs. 12/- per piece.

The following are some of the most popular Japanese Shirtings in the market to-day and market prices are given against each:

No.	Inches	Yds.	Lbs.	Warp	Weft	Reeds	Picks	Price per piece with duty.
3800	44	38	10½	30	36	73	70	Rs. 15/10
2100	44	38	7½	42	46	73	72	" 13/6
6600	44	38	6.18	40	46	64	50	" 10/14
8900	44	38	—	40	44	64	64	" 12/6
99000	44	38	8.	40	40	69	68	" 13/4
5544	44	38	6½	40	46	64	50	" 10/14
403	44	38	7.8	42	46	69	66	" 12/6
4500	44	38	10.	30	36	73	70	" 15/4
44000	44	38	6½	40	44	63	49	" 11/-
8181	44	38	8.	40	40	69	68	" 13/-
4141	44	38	6.18	40	46	64	50	" 10/14
Two Birds	44	46	9¾	40	40	69	68	" 15/4
Bow and Arrow	44	46	9¾	42	45	71	71	" 15/10
9000	38	38	7½	30	36	61	34	" 11/-
800	38	38	5½	40	40	63	49	" 9/6
600	38	38	5.	40	46	64	50	" 9/2
501	30	120	14.	40	46	64	50	" 23/-

The above qualities do not compete with Indian production. Indian Mills do not weave anything at all similar to these qualities. The Mill-owners themselves have repeatedly admitted in their oral evidence that they cannot produce above 30s. or at most 34s. as they have not got suitable cotton in India. They have also volunteered the statement that as a rule India has done far better by producing coarser than fine cloth.

TABLE I.

ALL-INDIA COTTON PIECE-GOODS PRODUCTION FOR 1924-25, ABOUT 1,930,000,000 YARDS.

A Coloured Piece-goods about 588,000,000 Yds. i.e. 30%		B Grey and Bleached Piece-goods about 1,342,000,000 i.e. 70%					
	C	D	E	F	G	H	I
These figures are taken from the Bombay Mill-Owners' Association's Statement.	Khadar 87,153,000 Yds. i.e. about 4½%	Drills and Jeans 77,191,000 Yds. about 4%	T. Cloths Domestics and Sheetings 77,742,000 Yds. about 4%	Printers Tent Cloths and other sorts 89,346,000 Yds. about 4½%	Chadars 61,614,000 Yds. about 3%	Dhoties, Sarees, etc. 458,404,000 Yds. about 23%	Shirtings and Long-cloths 525,524,000 Yds. about 27%
FOREIGN IMPORTS of the same class of goods (the figures are taken from the Sea Borne Trade of British India 1925.)	Japan (Grey) Nil " (Bleached) Nil U.K. (Grey) Nil " (Bleached) Nil	14,458,560 2,753,097 359,241 3,560,854	34,444,325 8,000 479,565 100,191	Nil Nil Nil Nil	Nil Nil 35,228 712,898	723,522 Nil 489,136,238 68,865,886	59,865,155 1,488,121 146,061,437 116,000,000

N.B.—The “market prices” quoted throughout this statement are not to-day’s ruling rates but those ruling in August. This is done so as to make the prices correspond with the market prices of Japanese and Indian goods quoted by the Mill-owners’ Association in Appendix I, page 34 of their Answers to the Boards’ Questionnaire. It would not have served the purpose of comparison to have given to-day’s prices as American cotton has declined about 6 cents per lb. since August last and therefore prices of Japanese and Indian goods must vary considerably at to-day’s cotton prices. We should also like to add here that the Japanese prices in Bazaar of AAAA and “Asahi” quoted by the Mill-owners’ as Rs. 13/- are entirely wrong and misleading. The correct prices should be Rs. 14/12 and Rs. 14/4 respectively. We cannot ascertain what quality is referred to under the designation “Toyo” and we therefore cannot say anything about its market price. Other inaccuracies are not so glaring and therefore we shall not dwell upon them.

YARN.—We need hardly say anything about the competition between Indian and Japanese Yarn. There is practically none as imports of counts upto 30s. have almost ceased. India’s production of the finer counts is too small and is absorbed by the Mills themselves. The imports of fine counts are primarily for the hand-loom industry and secondarily for those Mills who run weaving sheds only. A higher import duty would only make yarn dearer for them and put a serious disability upon a class whose interests ought not to be sacrificed. On the other hand we would request the Board to consider the desirability of restricting the present duty on Yarn upto 32 counts or 40 counts at the most.

PART II.

1.—The evidence tendered before the Board has brought out two important points very clearly, viz: (1) Despite the acute depression in the cotton industry, mainly owing to the operation of world factors, the cotton mills in India, with the exception of Bombay, are faring quite as well or perhaps better than in the pre-war days and (2) Even Bombay Mills which conserved their resources during the boom period and built up good reserve funds are showing a fair margin of profit to-day. As the future of the upcountry Mills is quite an assured one we shall confine our remarks mainly to the Bombay Mills. The average dividend paid out during the boom was 65 per cent. and if the Mills in Bombay had limited it to 50 per cent. the whole of the industry would have been in decidedly a better position now. All the flourishing cotton mills in Japan owe their prosperity to-day to the handsome reserve funds built up by them and we trust it is not uncharitable to remark that the policy adopted by the Bombay Mills of paying high dividends during the boom was indiscreet. It is only the prodigals who are reaping to-day what they sowed in the past; and living, as we are, in an age of survival of the fittest the Indian cotton industry as a whole would gain if the chronic weaklings were weeded out. Concerns which are feeble, financially or otherwise, are a source of weakness and constant danger to the industry as a whole and we trust that the Board has been fully enlightened as to the actual reasons that led to the liquidation, closing down or changing hands of the several Mills mentioned by the Mill-owners’ Association in their reply to Question 12. It is also a great pity that every individual Mill was not called upon to submit its balance sheet. That would have thrown a powerful search-light and would have enabled the Board to judge matters more accurately.

2.—Whatever the future may have in store for the industry and whether the Board recommends protection or not it is our humble conviction that the future of Bombay Mills is precarious. The danger does not lie in “Japanese competition”—assuming that phantom to exist—but in the competition from up-country Mills and especially Mills situated in the Native States which, apart from enjoying freedom in the matter of International labour regulations, are protected against British India Mills’ production by special duties. Up-country Mills now possess 60 per cent. and 54 per cent. respectively of the spindles and looms in India, and reveal a growth of nearly 8 per cent. in spindles, looms and the consumption of cotton, in recent years. All these Mills are slowly but steadily cutting into markets which were formerly Bombay’s special preserves and it is very regrettable that Bombay Mill-owners should ignore this solemn fact in their frenzy against the bogey of “Japanese Competition” which they have conjured up. A dip into the past history of Bombay Mills will show that for the exceptional boom period during the War and the wave of “Swadeshim” that followed it, they owed their prosperity to their export trade—chiefly to their yarn trade with China. That trade has been lost to her owing to the erection of about sixty mills in Shanghai. During the interval a large number of Mills were erected up-country with the result that Bombay found herself in the difficult position of not only having to absorb all that vast quantity of surplus yarn in the production of cloth but she also had to market that greatly increased production in a sphere that had been considerably narrowed down by the activities of the up-country Mills. A little adjustment is all that is required and that adjustment must be found in the discovery of suitable outlets for Bombay’s production.

3.—There is hardly any need to enlarge upon the causes that have led to the present depression, namely,

- (1) The self-imposed disabilities resulting from the over-capitalisation and under-capitalisation of Mills, affecting 8 lakhs spindles and 15,000 looms in Bombay alone.
- (2) The reduction of the consuming capacity of the ryot inasmuch as the latter cannot exchange the product of his labour for the same quantity of manufactured goods as formerly.
- (3) Curtailment of credit among all the middle-men from the manufacturer to the consumer; factors 2 and 3 together with the (4) lack of confidence among buyers on account of the continuous decline in the price of American Cotton have resulted in (5) the Mills having to bear the whole burden of carrying the stocks—a burden which is sufficient to sap the strength and strain the financial resources of the average mill in Bombay and which makes (6) the public and the Banks unwilling to lend them money.

4.—There is no need to dwell upon the vexed question of Exchange. Suffice it to say that the rate-to-day is Rs. 135 for Yen 100—so that, as the Mill-owners put it, the gain to Japan from depreciated currency is less than 6 per cent. as against 12½ per cent. or more to other foreign countries.

5.—A word or two about double shift. Night work for women and children will cease from the middle of 1929. Assuming, as the Mill-owners put it, that Japan will continue to work 2 shifts, but of eight hours each, the labour union movement is gathering such strength in Japan that Mill-hands will never consent to a proportionate reduction of wages for shorter hours. And if the Mills are to give 10 hours’ wages for 8 hours’ work the cost of production will be very materially increased. Hence Japanese

TABLE II.

IMPORTS OF JAPANESE DRILLS AND SHEETINGS IN THE PRESIDENCY OF BOMBAY EXCLUDING SIND.

Cotton Piece-goods.	1925—26 April to March		1926 January		1926 February		1926 March		1926 April		1926 May		1926 June		1926 July	
	Yards	Rs.	Yards	Rs.	Yards	Rs.	Yards	Rs.	Yards	Rs.	Yards	Rs.	Yards	Rs.	Yards	Rs.
GREYS Drills and Jeans: Japan ...	10261000	3663474	1576000	529730	570200	188738	724200	315271	700800	241686	451400	157356	160000	53502	109200	35471
Sheetings: Japan ...	20180990	6679222	1364400	420859	1266400	388719	1226000	380261	1253100	409907	660500	207664	403000	115567	1103700	318490

Mill-owners are extremely sceptical about the continuance of double shift after June, 1929.

6.—Now we shall pass on to the vexed question of protection. Two methods have been suggested (1) specific duties, (2) increase of import duties. The first has been rightly condemned by the whole trade as certain to prove inequitable and mischievous. They will tend "to do a great wrong, to do a little right"; and the Bombay Mill-owners themselves have complained of its gross inequity in East Africa. As regards any increase in import duties it cannot be condemned too severely. There is one point of overwhelming importance which seems to obtain scant attention. It will be admitted that the bane of the present situation is high prices and therefore a constant accumulation of stocks (due to causes enumerated in the preceding paragraph) which sap the financial resources of the Mills. Now, an increase in import duties will be inevitably followed by higher prices and this in turn will restrict consumption. Hence any measure that tends to curtail consumption instead of stimulating it must be dismissed as suicidal. Surely there are other ways and means of meeting the situation. The Mill-owners urge that 13 per cent. additional import duty will raise prices by about 6½ per cent. and the additional burden on the consumer will work out at one anna per head for about 80 per cent. of the population or a total burden of 2½ crores rupees. Far from rendering help, specific duties and higher import duties will defeat their own purpose. The sovereign remedy is to make the cloth as cheap as possible and bring it more and more within the reach of the consumer. This can only be done by reducing the cost of production. But is it possible to reduce this cost by ¾ to 1 anna per lb.? The Mill-owners choose to be sceptical, but we are absolutely confident (and we are equally sure that the Board shares our confidence) that it can be done and it will have to be done if the industry is to be saved. It may be difficult but where there is a will there is a way.

7.—It would be presumptuous on our part to suggest ways and means of reducing the cost of production, but in the course of the evidence tendered before the Board a number of witnesses have brought to light several factors which swell the cost to-day, namely, (1) the low production capacity of machinery which is old or which is improperly handled and looked after; according to our information 25 per cent. of the machinery is such and it makes a difference in production from 20 to 30 per cent.; (2) inefficient labour—due largely to a lack of interest in the proper training of the operatives; (3) the appalling rate of absenteeism which necessitates the employment of as many as 10 per cent. to 12 per cent. extra hands. If absenteeism could be reduced in Ahmedabad it should not be impossible in Bombay. The "Budli" system is estimated to affect efficiency by 30 per cent., (4) the absence of automatic looms and other labour-saving devices; (5) the uneconomical handling of cotton, coal, waste and stores and the charging of commission on production; (6) the extravagant managing agency system and the defective selling agency system;

(7) Mr. A. B. Tata says in his written statement that in the majority of the Mills yarn of 2 to 2½ counts goes to the heavy side in the cloth department and therefore there is an invisible loss of 3 to 6 pies per lb.; (8) labour wages are alleged to be excessive. It is for the Board to determine whether a reduction is possible or desirable; (9) the defective system of buying cotton as contrasted with Exporting Houses; (10) the absence of technical experts on the Board of Directors which results in costly mistakes. All these are disabilities which could be removed if there were a will to do so.

It has been also suggested that the Mill-owners' Association should bestir themselves about the creation of a yarn exchange and should educate its members about the utility and even the necessity of hedge operations.

Witnesses have also indicated various other directions in which the Government, perhaps, can give a helping hand in the way of reduction of railway and shipping freights, abolition of the Town Duty on Cotton and the import duty on stores and machinery.

Another remedy which the Bombay Mill-owners have always obstinately refused to adopt is curtailment of production in times of depression. England, Japan and America systematically resort to short time whenever there is a serious absence of demand and stocks begin to accumulate. But the Mill-owners retort that these countries do not import cloth and so they have nothing to fear; whereas India being a cloth-importing country short-time working would only give a chance to competing countries to steal a march over Indian Mills. This argument sounds very well in theory but it is fallacious to the core. The burden of the Mill-owners' song is that Japan is the only competitor. We have demonstrated in Part I what that competition amounts to. But assuming that spectre to exist, why cannot Bombay Mills go short time and curtail production in bleached and coloured goods (in which there is no competition at all) as well as in all styles of grey goods with the possible exception of one kind in which some negligible competition may be traced? There can be no question of Japan substituting goods in these lines. We trust the Board will grasp this important point and give it due consideration.

8.—Nothing further remains to be said beyond thanking the President and Members of the Board and you, Sir, for the great courtesy shown to us throughout. It is with supreme faith that we commend this statement to their kind consideration and we hope and trust that the Board's finding will justify our conviction that the Mill-owners' Association have failed to substantiate their case.

Most respectfully yours,

T. TAMAGAKI, *Agent*,

THE JAPAN COTTON SPINNERS' ASSOCIATION.

N.B.—I beg leave to inform the Board that the statement despatched from my Head quarters is due to arrive by the *s.s. Honolulu Maru* on or about the 10th Proximo and will be forwarded to the Board as soon as received.

Japan Continues Liberal Attitude Toward China

Baron Shidehara's Address to the Diet Outlines Japan's Program
To Promote Solidarity Between Two Nations

SPEAKING before the Diet, Baron Shidehara, Minister of Foreign Affairs, outlined Japan's attitude toward China during the present crisis:—

The problem of great international moment is undoubtedly the situation in China. For several years past China has been the scene of endless civil strife. Warring parties and theatres of war have changed rapidly, but there is no indication yet of restoration of peace and stability. In the meantime, the Southern Army, carrying a banner which represents a definite platform of political

and social reforms, since last summer has gained the upper reaches of the Yangtsze River and has injected a new element in the nature of civil war there.

Opposing that movement, various military factions which have hitherto been in the north and central China, have now formed a combination known as the Tranquility Restoring Army, which will result in the north and south actually confronting each other in both arms and platforms. It is not possible at this moment to estimate certainly how far this course of events will affect the rights

and interests of foreign powers or nationals or in what direction the political situation in China is likely to develop. For the present it seems particularly advisable to exercise the utmost circumspection and calm judgment. However, I will make a few observations as to the present state of affairs.

We are naturally anxious to see an early re-establishment of order and security in China. We have the utmost of sympathy with our neighboring friends, but at the same time realize self-guarding the industrial and commercial interest of our nationals. This can be attained, however, only by the initiative efforts of the Chinese themselves. Any attempt to force domestic peace by outside pressure would do harm more than good. With the object of lendings support and of providing a full opportunity for the endeavors of the Chinese people who are now struggling for peace, we have found it necessary to prohibit all supply of arms and loans to China which may be applied to purposes of civil war.

Since 1919 we have been exercising the most stringent control within the limits of our power to make that prohibition effective, and we have no intention at present of relaxing such a control. It seems evident that no foreign power which is professing a policy of non-intervention in China's domestic affairs can permit a supply of arms or loans that would assist any faction in China to carry on hostilities against another.

The Chinese themselves must decide who assumes the reins of the Government of China or what internal policy is sane and wise, and if such a policy has Chinese characteristics and serves to promote the internal prosperity and international prestige of China, it will naturally gain ground there. If on the contrary, it betrays these expectations, it will fall of itself. The national life of the Chinese people has grown up with the historical background extending over several thousand years and amidst peculiar surroundings.

No plans of political and social institutions worked out by any foreign nation can be imposed on China with lasting success.

Our nationals in China are entitled to complete protection of their persons and property and to enjoy all the guarantees international law as accepted by the whole civilized world.

These elemental rights, which are assured to our nationals, cannot be abridged or modified by political or social changes which may take place in China.

Obviously the control over the activities of the lawless elements in various localities at present is inadequate, but we hope such irregularities will be gradually corrected with the restoration of normal conditions. Meanwhile we have only to keep in touch with those who are actually exercising authority in each locality and to make all possible efforts to obtain that due protection to be extended to the persons and property of our nationals. So far these efforts generally have been successful.

Regarding the Chinese Special Tariff Conference, we sincerely regret that while they were in session, the domestic disturbances there assumed such serious proportions that the Chinese delegates found themselves unable to take part therein, and consequently the delegates of the other Powers issued a joint statement on July 3, declaring the suspension of the session until duly authorized representatives shall be appointed. The Conference thus virtually adjourned, but constant labor on the part of the participating delegations for nearly ten months has by no means been entirely fruitless. The Japanese delegates are particularly conscious of this nation's own past experience and mindful of the trend of public sentiment in China, and are willing to help China in concert with other Powers so that the Chinese national aspirations may be realized with worldwide friendly understanding.

Our delegation's efforts have now been widely appreciated and undoubtedly promoted a feeling of mutual confidence and good will between Japan and China. From the conclusion of the Washington Conference, we endeavored to bring about an early meeting of the Chinese Customs Conference. When the meeting was convoked, we responded readily and with a genuine desire to contribute materially to the advancement of general good of the Chinese people in any way reconcilable with the legitimate and essential economic interests of Japan.

We have no objection to levying surtaxes as provided in the Washington Customs Treaty, but we must make reasonably certain that such additional customs revenue will not be applied directly or indirectly to the purposes of civil war or will not appropriated to private use of any faction. We must satisfy ourselves that the proposed measure generally conforms to the letter and spirit of the

Washington Treaty. Our sense of faithfulness to China and our moral responsibilities to the four hundred millions of people demand that we should carefully supervise the levying of the surtaxes required and the proper application of the revenue. From this point of view, early resumption of the conference seems highly desirable for China and the Powers alike.

The report submitted by the Extraterritoriality Commission of China has already been published and I refer you thereto for details. The Commission has not been empowered to conclude a Treaty nor has the report a binding force upon any party, but it has undoubted value and importance, for it contains recommendations to the Chinese Government and expresses the opinion that when these recommendations reasonably complied with, the several Powers would be warranted in relinquishing their respective rights of extraterritoriality and also recommending certain modifications which Powers should make in the existing systems in practice pending the abolition of extraterritoriality, and suggesting that such abolition may be effected not for the whole Chinese territory but according to such a progressive scheme, geographical or otherwise, as may be agreed upon.

Regarding the proposed revision of the Sino-Japanese Commercial Treaty, the Waichiaopu's proposal involves many legal aspects which would appear at least questionable but approaching the subject from a wider perspective, we have avoided all discussion of legal technicalities and have declared our readiness to enter into negotiations on treaty revisions.

While expressly reserving to ourselves the rights to which we are entitled, we are prepared to consider the legitimate aspirations of the Chinese people with full sympathy and understanding in the interest of the Sino-Japanese friendly relations. If China should meet us half way in the same spirit of moderation and good will, I have no doubt that the negotiations will make satisfactory progress.

Japan's policy, covering all questions and relations between Japan and China, may be summoned as follows :

1. To respect the sovereignty and territorial integrity of China and to scrupulously avoid all interference in her domestic strife.
2. To promote the solidarity of economic rapprochement between the two nations.
3. To entertain sympathetically and helpfully the just aspirations of the Chinese people and to co-operate for the realization of such aspirations.
4. To maintain an attitude of patience and toleration towards the present situation in China and at the same time to protect Japan's legitimate and essential rights and interests by all reasonable means at the disposal of the Government.

We are happy to be able to state that the relations between Japan and the Soviet Union continue to be friendly. We have been informed that the concessions of oil and coalfields in Northern Saghalien obtained for Japanese interests in pursuance of the arrangement contained in the Peking protocol of 1925 developing satisfactorily, and that the negotiations on the revision of the Fishery Convention are now progressing, and we are looking forward to a successful conclusion.

Within two years since the signing of the Convention in Peking, mutual relation of the two countries have been steadily gaining strength and give a great promise for the future. There are certain sections of our people who believe that the interests of Japan and the Soviet Union are destined to clash in Manchuria, but we have no aggressive policy in Manchuria and elsewhere, our sole preoccupation being the maintenance of peace and order in that region and that our nationals be permitted to engage in peaceful pursuits there without molestation.

We believe that the Soviet Union does not differ with us in this fundamental policy and likewise has no aggressive designs, military, political or otherwise. It is obvious that both the nationals of Japan and the Soviet Union are much interested in Manchuria, but economic activities must be regulated along the principles of open-door, equal opportunity and it is improbable that such peaceful undertakings will bring about any serious complication between Japan and the Soviet Union.

"The situation in Europe seems to be materially stabilized by Germany's entry into the League of Nations and the enforcement of the Locarno Treaties. It is an event of profound significance for the progress of all mankind. That nations should now forget old

scores and join hands for the common cause of peace is good. We welcome German participation in the League of Nations.

No definite date has so far been fixed for the opening of the Disarmament Conference, but in any case, we heartily welcome and appreciate all efforts looking for limitation of armament and confidently hope that fair and practicable schemes may be worked out."

New Commercial Treaties between Japan and some European Powers have come into force since the last session of the Imperial Diet or are actually in the course of negotiations. Otherwise there are no events claiming special attention to our intercourse with Europe.

Our constant, and I may say, agreeable task is to maintain and strengthen the bonds of amity of all the European Powers. I regret to State that the question of the discriminatory treatment contained in the United States Immigration Act of 1924 still remains unadjusted.

I have nothing to say at present to modify or supplement the observations which I have made on many previous occasions, but I point out the evident welcome facts that on this and all other matters of common interest and true knowledge, sympathetic understanding of Japan has grown considerably in the United States in recent years, and that wild reports circulated at one time, discrediting Japan's pacific intentions, are now receiving general condemnation by an enlightened public opinion there. On our side, we should also fully appreciate the national institutions, of and conditions in the United States. Mutual understanding is the first essential step towards the settlement of all international questions and I am firmly

convinced that the two nations, being conscious of their important mission as guardians of the peace of the Pacific, will stand side by side all the time in friendly accord for the fulfilment of such responsibilities.

Due to the general reaction following the Great War and the terrible seismic disaster, the economic structure of this nation sustained a serious blow and the excess of imports over exports has assumed alarming proportions every year. Fortunately, within the last two years, such adverse trade balances have been showing signs of abatement but the existing conditions are far from reassuring.

In order to meet this situation, it is of the utmost importance to concentrate our attention and energy on the promotion of our foreign trade without unjust infringement of the interests of any nation.

We have in view markets, not territory, and economic solidarity, not alliances. Actuated by these considerations we called, in September last, a conference to discuss these questions, and the conference proved highly conducive to a mutual understanding between the Government authorities at home and abroad, and between authorities and non-official quarters, and in addition afforded the Government precious material for reference and guidance. The Fundamental principle governing our entire foreign relations, as repeatedly observed on several occasions, is the extension of honest friendship to all nations.

In the Imperial Rescript issued on December 20th, His Majesty was pleased to show beneficence to all classes of people and friendship to all nations on earth. Always bearing this Imperial mandate I shall strive toward this great aim.

Can Lancashire Maintain Her Export Markets?

Lord Emmott on the Bugbear of Japanese Competition

In reprinting Lord Emmott's statements from the "Textile Mercury," we call attention to the fact that the leaders in the British Textile Industry are at last realizing that not by political machinations but by following the basic economic laws of production and increased demand can their industry be improved. Japan can compete with Lancashire in India, but there is room enough in the world for Japanese and British textiles; the British manufacturer has to make cheaper and better textiles, has to use scientific means of production if he expects to compete successfully with Japan in India. High tariffs and politics will not achieve success, for what is gained in India through such means will be lost elsewhere by reciprocal high tariffs. The statement is of the greatest importance.

THE last five years was the worst quinquennial period the American section of the trade had been for over 60 years, said Lord Emmott, and 1926 was probably the worst of the five. There was hope now of better things in the future. Cotton had come down approximately, even if temporarily, to the level of prices prevailing before the war. The present day value of medium counts and even of cloth showed a less rise in value than the increase shown in the general level of world prices.

"The belief that we have seen the worst and may hope for improvement in 1927," continued Lord Emmott, "must not, however, tempt us to forget how markedly less our share of the world's trade is than it was in 1913. Take, for instance, the consumption of cotton. The world consumption, according to Mr. Keynes, before he visited Manchester, in 1925-26 was 24,600,000 bales against 23,000,000 in 1912-13, an increase of 1,600,000, or about 7 per cent. Our consumption was 3,022,000 in 1925-26 against 4,274,000 in 1912-13, a decrease of nearly 30 per cent. The only other countries that seem to have decreased their consumption are Germany (out of whose spindles 1,250,000 have been transferred to France) Russia, and India.

"Japan has increased her consumption of cotton by 80 per cent., while we have decreased ours by 30 per cent. I do not want to be a Jeremiah, but I find no reason for jubilation in these figures. Our cotton trade is, to my mind, in a more parlous condition as to its ultimate future than coal or iron.

"The real reason of our bad trade is that our exports have fallen off to such a great extent that it is impossible for the whole trade to find employment. Instead of the 7,000,000,000 yards of cotton cloth that were exported in 1913, we are only now exporting about 4,500,000,000 yards. If we could get back to an export of

6,000,000,000 yards we should, owing to the smaller number of hours that are being worked, be able to return to full time once more.

Important Far Eastern Markets

"The Far East (including India, China, Japan, the Dutch East Indies, and the Straits Settlements) is by far the most important market. In 1913 the Far East took 4,357,000,000 yards of cloth, that is to say almost as much as we exported to the whole of the world in 1924 and 1925, and more than we exported in 1922 and 1923, or shall export this year. In 1925 our exports to these markets were less than 2,000,000,000 yards, the falling off to India alone was over 1,700,000,000 yards that to China over 500,000,000. The figures for the nine months of 1926 are a little better, but they are only half the figures of 1913.

"Let us see what this means. In 1913 there were about 800,000 looms in the country. Assuming that the production of 160,000 looms was consumed in the home trade, the exports of that year show that roughly 400,000 were producing for the Far East markets and 240,000 for the rest of the world. Having regard to the reduced hours of working, it is safe to say that the same number of looms were fully employed in 1925 for the home trade and for the rest of the world, other than the Far East, while of the 400,000 looms employed for the Far East in 1913 more than half had no work for that market in 1925-16.

"Had the Far East taken the same proportion of its takings in 1913 as was taken by the rest of the overseas world, it would have meant an extra demand in excess of 2,000,000,000 yards; that would have meant more than two days extra working and full time for every spindle and loom in Lancashire."

The great decrease of all, however, is in the exports to India. What are the main causes of this decrease? For many years India has added to her spindles and looms and made more and more of her own yarn and cloth, but up to 1913 we were still able to increase our sales in that market.

"There seems to be two other main causes of the decrease. First, the increase of import duties and the removal (quite inevitable let me say) of the excise duties which has naturally led to an increase of India's own manufacture and a decrease in her imports of cotton cloth. Secondly, the new and serious inroads Japan has made on our trade with India.

"It is of this Japanese competition in India that I now want to speak. In reference to yarns, before the war India imported from the United Kingdom 37,000,000 lb. per annum and in 1925-26 less than 16,000,000 lb. Before the war Japan sent under 500,000-lb. to India. In 1925-26 India imported 33,500,000-lb. from Japan. India imports about 50,000,000-lb. per annum altogether, more than half of which is between 31's and 40's.

"It must be largely in those counts for which Oldham mills are particularly set out that we have lost so much business. That is a very serious matter.

"Coming to cloth, the figures, if not showing such a gigantic inroad into our former trade, are sufficiently alarming. The pre-war average of imports into India from the United Kingdom for grey cloth was 1,316,000,000 yards; in 1924-25 727,000,000, and in 1925-26 561,000,000 yards. The pre-war average of imports from Japan into India of grey cloth was 2,600,000 yards; in 1924-25 imports had increased to 109,800,000 yards, and in 1925-26 to over 142,000,000 yards.

"In bleached cloth the pre-war average for the United Kingdom was 643,000,000, in 1924-25 533,000,000, and 1925-26 446,000,000 yards. For Japan the pre-war figure was 100,000, in 1924-25 4,500,000, and in 1925-26 nearly 4,700,000 yards. Bad enough, but not so serious. In bleached cloth we have maintained our position better.

Colored, Printed and Dyed Cloth

"In the United Kingdom the pre-war average was 590,000,000, in 1924-25 338,000,000, and in 1925-26 267,000,000 yards. In Japan the pre-war average was 500,000 yards, in 1924-25 41,000,000, and in 1925-26 69,000,000 yards. An enormous increase.

"So that while the imports into India of our cloth in these three categories averaged before the war 2,549,000,000 yards, and had decreased by 1925-26 to 1,274,000,000 yards, the imports from Japan from a pre-war average of 3,200,000 yards had increased to 216,000,000 yards. In other words, of the 1,127,000,000 yards that we lost Japan had secured 213,000,000.

"Take the matter from another angle, the exports of Japan culled from Japanese sources. Our exports of cotton cloth in 1925 were slightly less than in 1924. Japan's in certain specified cloths, comprising the bulk of her exports, rose from 923,000,000 yards to 1,170,000,000 yards, or nearly 27 per cent. From the British point of view the curves of British and Japanese cotton manufacture are most disturbing.

Cheaper and Better Goods Required

"We can only meet the increasingly urgent factor of new competition in the long run by making goods better or cheaper, if possible better and cheaper, than other people, and it is quite

evident that working 28 hours a week only must tend to produce dear goods and not cheap ones.

"I do not suggest that we can go on to full time in this country unless and until a demand to keep our looms and spindles on full time working appears. I am seriously concerned, however, as to whether the leaders of the industry are taking the right steps to remedy the present unfortunate state of affairs.

"I have no sovereign remedy to put forward, but I want the trade frankly to face the situation in a different manner from that adopted hitherto. For some years I have held the view that the cotton trade in this country has not been sufficiently ready either to bring scientific study to bear on its problems or to solicit advice from financiers and economists who might be able to help in the very serious situation with which the trade has been faced during the last few years.

"Clearly we cannot afford to let such a trade go down and go under without making a desperate effort to save it. I do not feel that our efforts are desperate enough. I can see by your faces that you are saying 'Very well then, what do you advise?' I can only answer that question to the best of my ability.

"The first thing to do is to make up our minds as to whether the trade we have lost can be recovered. The second is to consider whether in such demand as there is, or is likely to be, we can meet the competition with which we are faced. If so, how?

"The Master Cotton Spinners' Federation seem to have devoted themselves too much to the consideration of how to secure a margin between cotton and yarn. But that must depend in the long run on demand. I am looking beyond temporary and artificially made profit to the restoration of demand. Get the demand right and profit and all these other things 'shall be added unto you.'

"It is cloth as well as yarn (more than yarn) that is the cause of our distresses. Spinners depend principally on manufacturers. Yet we hear so much less of the manufacturers.

Comprehensive Buying Needed

"I want to see a comprehensive inquiry made into the future probabilities of world demand generally, but particularly in the Far East. Concurrently, I want to see a thorough investigation made of the reasons why in regard to present demand we are losing our share of the trade.

"People in the industry can tell us, I suppose, in what goods and yarns we are being beaten and by how much. On the face of it our costs of manufacture have increased more than costs abroad. So far as I know, however, no one can tell us to-day what is the relative cost of making yarn and cloth as compared with pre-war figures in France, Belgium, Holland, Italy, Germany, Czechoslovakia, America, India, and Japan, and how the costs in those countries compare with the costs in ours.

Pertinent Questions

"How do wage costs there and here compare now with those in 1914? How about overhead charges, costs of building, etc.? What is the effect of the higher wages in sheltered trades here at home? In particular, how do the enormously increased taxes for the interest on war debts, social reform, and other Government needs and the greatly increased rates in this country compare with similar charges in competing countries? We know the interest on France's war debt is only a fifth or a sixth of what it would have been had the franc remained at par, while Germany's is wiped out. How do such facts affect our question?"

British Trade and Industry

By Gilbert C. Layton,

Special to the "Far Eastern Review"

The Coal Industry and Mechanical Appliances

AT the time of writing all the signs seem to indicate that the British coal dispute is entering upon its final phase. District settlements are being arranged, while well over 400,000 miners are actually at work. Thus normal is once more in sight. The

mineowners, however are considering steps likely to lead to further economics and in certain cases amalgamation proposals are under discussion. It might also be recognised that the increased employment of mechanical devices offers considerable scope for economics. The actual getting and filling of coal are the two directions in which there are the greatest possibilities for development in this direction.

While these machines are not perfect, they have been so improved in recent years that they are now highly efficient and reliable. It is only fair to say that there has been a slowly increasing recognition on the part of coal owners of the merits of machines. In the case of coal cutting machines, for instance, the percentage of machine-cut coal compared with the total output has advanced from 1.8 in 1900 to 8.5 in 1913; by 1920 the figure was 13.2, while in 1924 it was 18.7. Turning to points of particular interest, a noteworthy feature is the increasing use of the chain type of coal cutting machine, there being nearly ten times as many working now as eleven years ago; the present percentage is 51.7. Again there are more than twice as many electric machines as compared with compressed air. An important part of the cutting machine is the cutter pick and experience shows that the best results are obtainable only by using machine sharpened cutter picks. Thus at three different collieries the saving in power when using machine sharpened cutter picks, reported by recording wattmeters was 20 per cent., 26.5 per cent. and 33 per cent. respectively. Coal loaders are probably the most recent mechanical appliance to be introduced into the mines of this country. There is the gate-end loader, of which there are various makes; these machines operate in the main road and load the coal delivered by force conveyors into pit tubs. Undoubtedly the use of these machines results in economics and it is expected that they will be extensively used in the future.

The Iron and Steel Industry

The approach of the end of the coal dispute lends special interest to the iron and steel trade, for during the past few months activity has, thanks largely to the stoppage, been at an exceedingly low ebb. As regards the future, however, there are not wanting hopeful features. It is recognised, of course, that the iron and steel industries are hardly likely to regain their pre-strike activity before the New Year, but it would seem that there will be no lack of orders. Thus a report from the Midlands states; "Many of the heavy industries are only waiting the possibility of securing normal supplies of fuel to pass into a period of prosperous activity. A vast accumulation of orders has been piling up since May, and their execution will keep the iron and steel and heavy engineering industries busy for months. . . . Iron and steel masters books are so improved that they are confident of substantially increased outputs. Moreover, there is likely to be enormous new business booked in the near future." In certain quarters however, a rather perplexing situation arises in connection with the execution of orders booked at the comparatively low prices ruling before the stoppage. The subsequent rise in the cost of production has, in many cases, rendered these orders unremunerative.

As for production in the recent past, the figures issued by the National Federation of Iron and Steel Manufacturers show that there were five furnaces in blast during October and that the production of pig-iron was 13,000 tons, compared with 12,500 tons in September. Immediately before the coal stoppage, it will be recalled, there were 147 furnaces in blast, the production of pig-iron in April being 539,100 tons. The production of steel in October was 92,900 tons, in contrast with 95,700 tons in September, and 661,000 tons in April. The British coal stoppage is clearly reflected in the Continental production figures. Comparing the production of pig-iron in the first quarter with that in the third quarter, the latter discloses an increase of 22 per cent. in Germany, 50 per cent. in Belgium and 7 per cent. in France, while the production of steel increased by 29 per cent. in Germany, 73 per cent. in Germany and 6 per cent. in France. Imports of iron and steel into the United Kingdom in October totalled 398,000 tons, this being a decrease of 417,500 tons compared with September, the average imports in the first quarter were 236,200 tons.

Marine Oil Engine Design

The two-stroke double-acting motor will prove the final type of reciprocating marine oil engine; the accumulated experience, of to-day removes this from the realm of prophecy. This in short, is the view of Mr. B. W. Shannon, who is well-known as a designer of oil engines. While the adoption of the two-stroke double-acting principle has simplified the problem of design in many directions, the increase in size of cylinder has often brought about serious liner and ring wear. The great strides that have been made in metallurgy

have reduced the problem of the largest oil engine to one of comparative simplicity, but a few remaining defects have still to be eliminated. Among the more important is that connected with the walls surrounding the combustion chamber. It involves, in order of importance, the cylinder liner, its cover and piston, and in the case of a lower combustion space, the piston rod. Mr. Shannon, in dealing with cylinder covers, illustrates a simplified method of rendering the seats of valve housings tight against cylinder pressures and gives details of an improved form of compressor cylinder head in which the number of component parts is greatly reduced.

As regards the question of gaseous oscillations, Mr. Shannon remarks that very little experimental work is on record in this connection, so that there is small help in attempting to control oscillation phenomena intelligently or placing the subject upon a mathematical basis. Turning to the controversy regarding the rival claims of air and airless injection Mr. Shannon states that, as the tendency of new design is always in the direction of simplification, it may be assumed that airless injection will before long prevail for all types of engines. He points out, however that air pulverisation gives the most complete combustion, and therefore the cleanest engine. At any rate, it is held that air injection should be adhered to until the fuel consumption per indicated horse-power is about the same for both air pulverisation and airless injection on a given type of engine. If the consumption per brake horse-power is the same, the airless injection engine is only saving the work done in the compressors to throw it away in incomplete combustion. This is bad engineering, despite the fact that a simpler engine is produced.

The Future of the Steel Industry

A number of events have recently combined to focus exceptional attention upon the iron and steel industry. In the first place, the conclusion of the coal dispute provided an occasion for stock-taking. In the second place, in the course of one week several large companies published reports that were unsatisfactory in the extreme, while a five years' moratorium respecting the prior charges has been asked for by Sir W. G. Armstrong, Whitworth and Co. Finally, several leading iron-masters have had the opportunity to express their views on the future. As for the recent past, the gravity of the situation is undeniable. Thus the National Federation of Iron and Steel Manufacturers figures for November show that the pig-iron output amounted to 12,700 tons, as compared with 539,100 tons in April (the last month before the coal stoppage); the production of steel totalled 97,500 tons, in contrast with 661,000 tons in April. It may be hoped, however, that the November figures will be the lowest for many years to come.

Certainly some of the chief manufacturers see ground for optimism. For instance, Sir Arthur Dorman; who has a wide experience of the industry, was distinctly optimistic in addressing the annual meeting of Dorman Long and Co. "I think," said Sir Arthur, "I may safely say that the prospects of the immediate future are brighter than they have been at any time during the last five years." Moreover, he was reasonably optimistic regarding the more distant future. Viscount Furness, speaking at the meeting of the South Durham Steel and Iron Company, also referred to a large accumulation of orders. At both meetings there were allusions to the European steel pact, Lord Furness remarking that if British makers were offered equitable terms of membership, they would be seriously considered, while Sir Arthur Dorman also seemed favourably disposed towards British participation. It has to be remembered, however, that at present the industry is not sufficiently co-ordinated internally to allow of its joining the cartel. Whether or not amalgamations will shortly be effected is uncertain, but it is noteworthy that there is talk of new groupings. At any rate, the British decision has to be taken before long and in many quarters it is felt that the steel industry will give the lead in policy to British industry as a whole.

The Position of Coal

As conditions in the coal industry approach normal, it is natural to count the cost of the dispute to the industry itself. The loss directly resulting from the suspension of coal mining has been put at £140 millions. This loss is in view of Britain being a coal exporting country conspicuously reflected in the overseas trade returns.

Thus in the seven months May to November imports of coal were valued at £37.2 millions, as compared with only £11,594 in the same seven months of 1925, while coal exports for the same period, at £825,412, compared with £15½ millions. Therefore, coal alone accounts for an addition of £52 millions to the adverse merchandise trade balance. As regards the present position of the industry, the latest figures available show that for the week ended December 4th the output amounted to 3,226,100 tons and the number of wage-earners totalled 730,100. There are expectations, however, that there will be a considerably larger weekly output before the end of the year. All the same, merchants are not experiencing the domestic demand that was anticipated, for consumers—including industrial users—are buying sparingly in the belief that prices will shortly be lower; there has already been a considerable reduction from the high prices ruling during the stoppage. Supplies do not appear to be evenly distributed and there is a certain controversy regarding coal wagons, some of the railways contending that merchants are causing congestion by holding wagons at the wharves, while the merchants argue that there is a grave shortage of coal at the wharves owing to the defective working of the railways.

As for the export position, restrictions on the export of coal have been removed. But here also demand is, generally speaking, less than was expected. For instance, it is reported from the Humber that the market "is by no means brisk, foreign buyers apparently being slow to place contracts until they are satisfied that prices have fallen to a competitive level." Again, a Cardiff report states that "foreign consumers maintain a cautious policy." It would seem that prices, both for domestic and foreign business, will have to reach a basis of greater stability before more normal conditions return.

Electricity Output—Past and Future

During recent years there has been increasing recognition of the great importance of cheap power in industrial economy. Therefore, students of the development of electricity in Great Britain welcome the publication of the Electricity Commissioners' annual report, for it gives a comprehensive survey of electricity in this

country. In short, the recently published report for the year ended March 31st, 1926, records a further expansion in the output of electricity in Great Britain, but the rate of increase during the last few years shows a continuous decline. The total number of authorized undertakings in Great Britain, at the end of the period was 596, of which 356 were in the hands of local authorities (including joint boards) and 238 in those of companies and persons, while two in England were controlled by joint electricity authorities. The number of units generated, by 584 stations, was 8,122,961,823 and the fuel consumed included 8,263,880 tons of coal 142,876 tons of coke and 38,810 tons of fuel oil. These figures show an increase as compared with the previous year of about 9.5 per cent. in the number of units generated and an increase of about 5.2 per cent. in the consumption of coal and coke. The consumption of oil fuel, however, represented a decrease of 28 per cent. The figures of the units sold for the calendar year 1925 disclose that the sales of electricity by authorised undertakers have increased by over 50 per cent. since 1922; in 1925 output represented an average consumption—in approximate figures—of 125 units per head of the population. There was again a general tendency towards a lowering of charges.

As regards the decline in the recent rate of increase of consumption, there is no large body of opinion that saturation point is being approached. It is pointed out that industry takes nearly three-quarters of the total output, so that the trade depression is sufficient to account for the slackened pace of development. The Government's Electricity Act, however, is expected gradually to stimulate consumption. Though falling short of the expectations of its promoters, it lays the foundations of a national system of electricity supply. Its main principles, which are in accordance with the most advanced tendencies of modern economic thought, have been admirably summarised thus: "Centralisation of control, specialisation in the generation as apart from the distribution of electricity, concentration of output in the most efficient units, amalgamation of supply undertakings in joint electricity authorities acting in conjunction with the Central Board, standardisation and uniformity in production and in costing (and) regulation of price both to the distributor and the consumer."

Mr. Brisbane Sees the Light

IN December, 1925 and January, 1926, the *Far Eastern Review* called Mr. Arthur Brisbane, editor of the Hearst Newspapers, to task for his unjustified and unjustifiable attacks on Japan. We invited him to come to the Far East to see for himself. Mr. Brisbane has now seen the light, even without coming to the Far East. He now realizes that Japan is friendly to the United States. He realizes that Japan has no intention of making war on the United States. It has taken time. It has cost much in ink and paper to convince Mr. Brisbane and other American editors that the Japanese war scare is the bunk, the horrible nightmare of a vile propaganda. In the comity of nations to-day, the United States and Japan stand absolutely together—only the permanently biased do not understand that.

But let us use Mr. Brisbane's own words:

Japan has placed in Great Britain an order for twenty-five passenger airships, costing \$50,000 apiece, each able to carry twenty passengers. These British-made Japanese machines will carry two engines developing 1,000 horsepower.

The Japanese are friendly and they are not worried over talk in the oil trial about serious trouble with Japan two or three years ago.

And it is fortunate that Japan IS so friendly to us. For if THEY ever started a non-stop flight their ships wouldn't come down. This poor little country has a few ships that can GO up, but they can't STAY up.

Whether Japan is ordering aeroplanes from Great Britain or not, we do not know and do not care. That is Japan's business. But it is significant that Mr. Brisbane, Japan's bitterest enemy

in the United States, realizes that Japan is friendly to the United States. We have contended that that was the fact for many years. We have been attacked and ridiculed by the war-mongers and scare-mongers during those years. We have fought to give our readers and the American people the right point of view on the Far Eastern political complex. For the business man in the United States and Great Britain naturally is more anxious to know whether there are possibilities of peace between his country and Japan than about almost any other phase of this problem, as he cannot make his merchandizing calculations without accurate data as to the political conditions of his market. Japan is still the largest market in the Far East, in spite of the immensity of the size of China and its future possibilities. In spite of the fact that Japan has within fifty years become one of the principle powers of the earth, the European and American traders have lost nothing when they lost their exceptional privileges in Japan: in fact, they gained. For as Japan grew stronger, trade and industry increased and the trading and industrial nations of the world benefited by the increase.

It was naturally expected by Americans that Japan would resent American race prejudices against the Japanese and that Japan would build her strength, her army and navy with a view toward eventually fighting out this question with the United States, Japan, however, was more broad minded and more far-sighted. Japan sought not to win equality in the United States by warfare, but by proving her equality as a nation, by the development of industry and commerce, by providing her people with an advancingly higher standard of civilization and culture, by producing higher standards of living. Again we suggest to Mr. Brisbane: Just as your enmity was based upon hearsay, so your friendship is only based on hearsay. Come out to the Far East and see for yourself!

Japanese Imperial Government Railway

New Locomotives for I. G. R. Standardized, Interchangeable

THE Imperial Government Railways of Japan have undertaken a project that involves the eventual electrification of some 9,000 miles of track, to enable the more effective handling of the rapidly increasing traffic on its narrow gauge lines. The Tokaido line, which extends from Tokyo through Yokohama to Kobe, a distance of about 375 miles, and the Chuo or central line between Indimachi and Kofu, a distance of about 80 miles, have the heaviest traffic and logically were the first selection for electrification. A complete description of the electrification program appeared in the "Electric Railway Journal," September 12, 1926.

In connection with this main line electrification, more than 40 electric locomotives have already been delivered. Particularly for handling the service and meeting the conditions on the two lines mentioned previously, the Imperial Government Railways in 1925 ordered eight more Baldwin-Westinghouse electric high-speed passenger locomotives involving six local and two express service units.

Designed Carefully

Their design has been worked out carefully to provide the greatest possible degree of standardization of locomotives to meet all local and express passenger service. The idea has been carried to the point where all details of the units excepting cabs, main frames and equalization systems are interchangeable. This feature is greatly desirable from the maintenance standpoint as the variety of stock of spare parts that must be maintained is minimized. By this advanced state of standardization complete driving units consisting of the motor mounted on the driving axle, and the wheels can be transferred from one class of unit to another without difficulty.

Each locomotive has a single box-type cab, having an operating compartment at each end and an equipment compartment between them. The articulated trucks have bar-type cast steel frames outside of the drivers, substantially braced by cast steel cross ties and bumpers, and supported by a three-point equalization system on the express-passenger class and by a through side equalization on the local passenger class. The cross equalizer on the express-passenger type is directly behind the first pair of drivers. Lateral centering devices and spring buffers between the main trucks have been provided to give better riding characteristics. The main truck distribution and stability is obtained from the cab through center pins and cab spring supports. The wheel arrangement is 1C+C1 for the express-passenger locomotives and 1B+B1 for the local passenger units.

Spur Gears Flexible

Flexible heat treated spur gears are used on both types of locomotives. Flexibility is obtained by means of coil springs interposed between the gear rim and center, which tend to cushion sudden impacts on the teeth, and decrease vibratory noises. Standard MCB automatic type couplings have been provided as the Imperial Government Railways is changing from the continental type which was its former standard.

The Westinghouse airbrake equipment is a combination vacuum and air type. The locomotive brakes are controlled by air and the train brakes by the vacuum, but the operation of both is synchronized. Rail guards are attached directly to the truck frames so that they will follow the curvature of the track to remove obstacles from the rails. Following are some principal mechanical data for the two types:

	1B+B1	1C+C1
Gauge of track	42"	42"
Diameter of driving wheels	49"	49"
Diameter of truck wheels	37"	37"
Driving wheel base rigid	6' 8"	13' 4"
Driving wheel base total	33' 0"	46' 4"

	1B+B1	1C+C1
Length overall	41' 0"	54' 4"
Length of cab	32' 0"	38' 0"
Width of cab	9' 1"	9' 1"
Height rail to top of cab	11' 3½"	11' 3½"
Height rail to top of cab hatch	11' 6½"	11' 6½"
Height rail to closed position pantagraph	12' 10"	12' 10"
Journals driving	6"×9"	6"×9"
Journals truck	5"×8"	5"×8"
Weight on drivers	114,160 lb.	152,540 lb.
Weight on trucks	36,738 lb.	32,720 lb.
Weight Total Locomotive	150,898 lb.	*185,260 lb.
Weight Mechanical Parts	94,575 lb.	111,168 lb.
Weight Electrical Parts	56,323 lb.	74,092 lb.
Couplers	M.C.B.	M.C.B.

The main traction motors, designed particularly for the Imperial Government Railways, each has a nominal rating of about 333 h.p. and embodies the characteristics required for the service and the narrow gauge. They direct current.

Three Sub-Divisions

The equipment compartment has three sub-divisions, the central one of which houses the high tension equipment consisting mainly of accelerating grid resistance, accelerating unit switches, overload protective devices, air-operated traction motor-reversing mechanism and high tension fuses for the auxiliary circuits. A compartment at one end of the high tension section contains vacuum and air-brake control apparatus, one combination blower and control generator set, one 1,500 volt d-c. compressor with a capacity of 50 cu. ft. of free air a minute, a watthour meter, terminal boards for control wires and one battery box containing a 7-cell 60-amperehour lead storage battery for energy supply for the control circuits. In a similar compartment at the opposite end of the high tension section are located another combination blower motor and control generator set, a 1,500-volt d-c. exhaustor (same as compressor except with reverse operation), a 33-volt generator panel for regulating the generator voltage of the two combination sets, a panel for the storage battery, control and lighting circuits and another 7-cell storage battery which is connected in series with the battery in the compartment at the other end of the cab. Three 1,500 volt d-c. hand operated canopy switches on a panel above the combination set in this compartment are used to connect the auxiliary apparatus to the line. One is used for operating the two combination blower-generator sets (the blowers of the two sets are connected in series). The other two switches control the exhaustor and the compressor.

Each operating compartment contains a meter and gauge panel with control and headlight switches at the top, cab lighting switches in the center and directly beneath them their air gauge and two vacuum gauges, high tension voltmeter and ammeter for the traction motor circuit. A locomotive speed meter is also a part of the equipment. This meter is energized from an electric tachometer which is driven by a runner riding on one of the drivers. It is calibrated to read kilometers an hour for either forward or backward movement of the locomotive.

Left Hand Control

As left hand drive is standard practice on the Imperial Government Railways, the master controller, brake valves and other operating devices are located on the left hand side of the respective operating compartments. The meter and gauge panel is located at the right of the engineer. To the extreme left of the engineer

*Without sand, tools and equipment doors.

is the independent brake valve for controlling the brakes on the locomotive only, or if locomotives are doubleheaded it will control the brakes on both. The automatic vacuum brake valve is directly in front of the engineer. A foot-operated push button switch for controlling the sanding device through electro-pneumatic valves is easily reached by the engineer's foot. This mechanism also controls the sanders on both locomotives when double-heading. Pantagraphs are raised and lowered by the manipulation of hand-operated push button switches located beneath the window still at the left of the engineer. When double-heading, all pantagraphs are under the control of one engineer and are raised or lowered in synchronism. The complete layout of both the express and the local passenger locomotives is shown in the accompanying diagram. The cabs are heated with 1,500-volt, 1,200-watt heaters.

In addition to the two pantagraphs are arranged for field control, and force ventilated by two combination blower motor and generator sets. Four motors are used on each local passenger locomotive and six motors on each of the express passenger type. On both types of locomotives the motors are mounted on the axles and directly geared to the drivers with a 64.24 gear ratio. They are arranged to operate two in series on 1,500 volts on the roof, there are a lightning arrester and main circuit fuse. Two fuses are used on the express passenger locomotives due to the greater capacity.

Control is of the double-end Westinghouse type HBF. The storage battery supplies current for operating the electro-pneumatic unit switches in the main switching circuit.

Sets Interchangeable

The combination blower motor and control generation sets are the same in both types of locomotives, except that the blower fans for the passenger locomotives are slightly larger than those on the local passenger units. However, all sets are interchangeable. The 33-volt control generator on one end of the combination set supplies the energy necessary for charging the storage battery and for lights and control. The armatures are connected in parallel and the two fields in series. A carbon pile in series with the field circuit of the two generators is actuated by a mechanism to maintain 33 volts at the generator armature terminals. While the combination sets are operating the voltage does not exceed 33-volts and when shut down the lighting voltage drops to battery voltage which is approximately 28 volts.

The combination vacuum and airbrake equipment is used to accommodate cars that already are equipped with the vacuum system. The locomotive is controlled by the air brakes which act either independently of or in conjunction with the vacuum brakes. In the latter cases the vacuum brakes act as the pilot for the air-brake system.

A 21-inch vacuum is maintained in the vacuum reservoir by a two-speed 1,500-volt exhaustor. When the locomotive is in operation the exhaustor runs continuously at a slow speed.

Book Reviews

Skinner's Cotton Trade Directory

THE 1926-7 issue is the Fourth Edition of Skinner's Cotton Trade Directory of the World. That it is a world-wide Reference Book is borne out by the fact that its 80,000 entries cover every country and town that has any association with cotton. Moreover, it purports to be more than a collection of names and addresses. By consulting the details given regarding firms, users of the book are in a position to judge of each firm's suitability for the purpose in hand. As showing the completeness with which every section of the Cotton Trade is dealt with, it will interest our subscribers to know that particulars are given of 7,400 Raw Cotton Exporters, Merchants and Brokers; 1,000 Cotton Waste Merchants; 10,500 Cotton Spinners and Manu-

facturers; 8,000 Directors and Managers (British only); 2,500 Yarn Doublers, Bleachers, Dyers, etc.; 3,500 Yarn Agents, Merchants, Exporters; 3,000 Piece Goods Dyers, Finishers, etc. 6,000 Piece Goods Agents, Merchants, Exporters, etc.; 2,000 Artificial Silk Producers, Manufacturers, Dyers, etc.

In order to enable Skinner's Cotton Trade Directory to be read and understood by business men of all nationalities, every heading, explanatory paragraph and index is rendered in the six commercial languages of the world—namely: English, French, German, Spanish, Italian and Portuguese, it being our intention that the advantage of the information contained in the book shall be available for all business firms and individuals in every country throughout the world. As the demand on our space has forbidden the giving of particulars of firms in more than one language, English has been chosen as being understood by the textile interests of most countries, and, for further elucidation of the data embodied in those particulars, we have compiled a glossary in the six languages of all terms not self-explanatory.

The enormous mass of material to be dealt with has rendered a volume of the present size inevitable, but it will facilitate the use of the work if it is borne in mind that its contents have been arranged in the same sequence as occurs in the operations of the Trade itself, that is to say, the Sections commence with the exporters of the raw cotton from the cotton-growing countries, and proceed, by way of its merchandising, to the subsequent manufacture into yarns and cloths. Later come the dyeing and finishing stages, yarn and cloth being dealt with in two separate sections, each of which also indicates the agents, merchants and exporters through whose hands the goods pass. The "Fabrics" section now shows a wide range of 360 Fabrics, giving no less than 20,500 names of manufacturers able to supply them. This section should undoubtedly prove of the utmost use, more especially as the latest types of novelty cotton fabrics are included. The "Mill Supplies" Section has a classification, under 1,300 headings, of all items of plant and supplies that may conceivably be required in the construction, renewing or maintenance of a cotton textile works. Such a section will undoubtedly save the Mill Manager much time when planning renewing his plant. All the headings are in the six languages above named.

Many firms in the Cotton Trade are now interested in Artificial Silk, and the special section for this material we introduced in the last edition has been brought up-to-date to include the new enterprises established during the current year. The list of producers of Artificial Silk filaments will be found of extreme interest, as will also the details assembled regarding each of these concerns. This information should therefore be of considerable value to the continually increasing number of firms now combining this material with their cotton productions. For the same reason the section giving data as to plant required, either for manufacturing the filaments or for subsequent processes, will satisfy the enquiries of many who are considering entering this field.

With considerable gratification we are able to announce that a special support has been accorded us by the chief Cotton Trade Associations in every country; among them might specially be mentioned the International Federation of Master Cotton Spinners' and Manufacturers' Associations, Manchester; Arbeitsausschuss der deutschen Baumwollspinnerverbände, Berlin; Associazione Cotoniera Italiana, Milan; Association Belge de Tissage, Ghent; Societe Co-operative "La Textile," Ghent; Asociacion de Fabricantes de Hilados y Tejidos, Barcelona; Svenska Bomulls-fabrikant-foreningen, Goteborg; Norwegian Cotton Mills' Association, Oslo; East India Cotton Association, Bombay; Bombay Millowners' Association, Bombay; Japanese Cotton Spinners' Association, Osaka; Chinese Cotton Millowners' Association, Shanghai, etc., etc.

An interesting paper on "A Century of Permanent Way," was read before the Annual Convention of the Permanent Way Institution held in Sheffield by Fred. Bland, M.I.MECH, E., F.S.A., President of Sheffield Section, Permanent Way Institution, 1925, Director Tramway Department; Edgar Allen & Co., Ltd. The paper is issued by Edgar Allen & Co., Ltd., and is beautifully illustrated with old and modern photographs and prints of railway developments.

Trade of Formosa in 1925-26.

THE British Consul at Tamsui in the course of his Report on the Financial and Commercial situation in Formosa states that although Japanese firms and residents in the Island are still complaining of hard times, there can be no doubt that Formosa, dependent as it is mainly on agriculture, has never been more prosperous, and that the Chinese peasants, who form nearly 90 per cent. of the population, are exceedingly well off. This favourable result is principally due to the large crops of rice harvested in recent years and sold at high prices, and to the enormous development of fruit crops, such as bananas, pineapples, oranges, etc., for export to Japan. The production of sugar, although suffering from the inroads of rice cultivation, is well maintained; the output of coal has approached the two million ton mark, and both exports and bunkers increase year by year; pouchong teas continue to find an expanding market in Southern Asia, though the oolong tea trade appears to have seen its best days; the camphor industry affords a large source of revenue to the Government. It even appears possible, from results recently obtained, that Formosa may prove a source of oil supply in the future.

The total value of imports and exports during 1925 was Y.186,395,000 and Y.263,215,000, as against Y.133,026,000 and Y.253,674,000 in the previous year, while during the first five months of the current year the respective totals were Y.78,859,000 and Y.141,246,000. The bulk of the trade is with Japan, that country in 1925 contributing Y.129,906,000 of the imports and taking Y.215,249,000 of the exports. During the past five months of the current year Japan's share was, imports Y.48,822,000 and exports Y.122,639,000. The total trade for 1925 was about Y.60,000,000 higher than that of the previous record year—1920.

Imports from Japan in 1925 increased by almost exactly 50 per cent., or Y.43,000,000, as compared with 1924. The increase extended to the majority of the imports, and may, to a large extent, be attributed to the increased buying power of the population, resulting from the high prices obtained for rice and other agricultural products. For instance, imports of cotton piece-goods rose from Y.8,000,000 in 1924 to Y.15,700,000 in 1925, a fact which is ascribed to internal prosperity, though re-exports to South China also showed an increase. This increase in imports from Japan is, however, not so significant as would appear at first sight, as 14 million yen of the total increase is accounted for by rice. During 1925 the duty on foreign rice was suspended in Japan, but not in Formosa. Consequently it proved cheaper to re-export foreign rice from Japan to Formosa than to ship direct to the Island from Rangoon and elsewhere. Direct import has, however, now been resumed, and this factor no longer affects the import returns.

The increase in imports from foreign countries—from Y.39,000,000 in 1923 to Y.56,000,000 in 1925—is almost entirely to be ascribed to the great increase in the use of sulphate of ammonia, bean-cake and other fertilisers.

Exports to Japan showed a progressive and healthy expansion during the years under review, as the result of increased production and rapidly expanding shipments of rice to the mother-country.

The export trade to foreign countries was favourably affected during the year 1925 by the situation in South China, and this factor is still making itself felt in 1926. Apart from this abnormal and probably transient cause, however, Formosa's exports of such commodities as coal, pouchong teas, camphor and sugar continue to show steady progress. The China situation has also given rise to the entrepôt trade of some dimensions at Keelung, goods being shipped to that port from Canton and thence re-shipped by Japanese steamers to Southern Asia, and even to Europe.

Fertilisers.—As is natural in a highly productive agricultural Island, fertilisers constitute the largest import, bean-cake and sulphate of ammonia being by far the most important descriptions. Bean-cake is obtained from China, and is extensively used on both rice and sugar lands. It is only a few years since sulphate of ammonia was first introduced on sugar plantations in Formosa, but in 1925 imports had reached 30,000 tons, valued at Y.5,546,000, the corresponding figures for 1924 being 10,600 tons, valued at Y.1,825,000. In 1924 the United Kingdom supplied nearly 75 per cent. of the total imports, but Germany entered the field in 1925, and during the first four months of 1926 supplied over 9,000 tons, as against 5,500 tons from the United Kingdom.

Rice.—The production and export of rice in 1925 amounted to 31,967,000 bushels and 330,800 tons as against 36,137,000 bushels and 253,600 tons respectively in 1924. Two crops are produced annually, and the exports are all to Japan.

Sugar.—Though rice-growing is economically more important, sugar forms the largest item of export. Shipments (to Japan) amounted to 425,038 tons, valued at Y.119,911,187, in 1924, and to 426,791 tons, valued at Y.105,651,158, in 1925. In the 1925-26 season the area under cultivation was 260,993 acres, producing 479,000 tons, while in the previous season the totals were 275,730 acres and 472,000 tons respectively. Last year 21,165 tons of sugar, valued at 4,584,556 yen, were imported (chiefly from the Dutch East Indies) for refining in Formosa. The corresponding figures for 1924 were 18,149 tons, valued at Y.3,838,369.

Tea.—The quantities and values of oolong tea exported to foreign countries in 1925 and 1924 were 10,673,000 lbs., valued at 5,220,958 yen, and 12,165,000 lbs. (4,864,578 yen).

Coal.—The following figures show the position in the Formosan coal industry in 1924 and 1925:—

Particulars.	1925, Tons.	1924, Tons.
Production	1,650,000	1,400,000
Exports to foreign countries ...	700,000	671,000
Export to Japan	189,000	198,000
Ships' bunkers	184,000	154,000

Island consumption accounted for about 550,000 tons in 1925. Up to the end of May, 1926, exports to foreign countries amount to 333,000 tons, and those to Japan to 64,000 tons. The chief feature in the export trade is the shipment of coal to Canton instead of Hongkong, as heretofore, owing to the boycott at the latter port.

Camphor.—Exports of crude camphor during the years 1925 and 1924 totalled 3,444,000 lbs. and 4,787,000 lbs. respectively, while during the period January-May last the total exports amounted to 1,536,000 lbs. The total value of exports of camphor was Y.5,803,000 in 1923, Y.6,527,000 in 1924 and Y.4,524,000 in 1925. Japan was overstocked in 1925, and made no purchases after the first five months of that year. Although exports to the United States increased from 699,000 lbs. in 1924 to 1,792,000 lbs. in 1925, those to all other foreign countries fell off very considerably, and this important Formosan industry is now feeling the competition abroad of German synthetic camphor. To meet this situation the Monopoly Bureau reduced the price of crude camphor from 1st May, 1926.

Opium.—Imports of opium, which stood at 133,700 lbs. in 1923, dropped to 71,800 lbs. in 1924, but rose again to 155,300 lbs. in 1925 while some 44,000 lbs. had been imported up to the end of May, 1926. During the past two and a half years nearly the entire supply has been obtained from Persia.

Alcohol.—Exports of alcohol to Japan and China increased in each year and amounted in 1925 to 13,578,570 litres, valued at Y.5,841,879.

Cement.—The total exports of cement to Japan and foreign countries in 1925 were valued at Y.1,443,245, a decrease of 50 per cent. as compared with 1924. In the latter year there were very large exports to Japan for earthquake reconstruction purposes, which dwindled to insignificance in 1925. Exports to foreign countries (chiefly Hong Kong, Manila and Saigon) continue to show some advance.

Wheat and Flour.—Owing to the remission of import duties there were large imports of wheat from Australia and Canada in the first quarter of 1924, and the total for the year exceeded 12,000 tons. In 1925, however, imports receded to 6,000 tons, divided about equally between Australia and the United States. This declining tendency has continued in 1926. Imports of wheat flour from Japan show a steady increase and reached 18,000 tons, valued at about Y.4,000,000, in 1925.

Cotton-piece Goods.—Imports of cotton-piece goods from Japan, which, together with silk fabrics, were valued at Y.6,472,000 in 1923, increased to Y.7,916,000 in 1924, and to more than double that figure in 1925, when the total was Y.15,708,000. This result is mainly ascribed to the increase in the buying power of the native population. At present, however, the market is much overstocked. Another cause of the advance is the growing tendency for Japanese piece-goods to be re-exported from Formosa to South China. Direct imports of British and other foreign goods are small and decreasing, but fairly large quantities probably find their way to the Island via Japan,



Tea Estate with Manager's Bungalow



After the dry tea has been sorted mechanically it is re-sorted by hand by women, who also remove the stalk, fibre, etc. This hand-sorting is done very carefully in Java

Advance of the Java Tea Industry

THE prominent place of the tea industry among other agricultural industries in the island of Java, and the economic and financial interests involved thereby, render it advisable for other tropical countries to follow with attention the trend of events in this colony.

It has been very largely owing to the improvement in the equipment of the tea factories that the quality of Java tea has become a good reputation on the world market. As a rule, the commodity has not the full strength of Indian nor the flavor of the finest China teas, but it is pure and wholesome.

The center of the tea industry in Java is the Western part of the island (Preanger province and vicinity) where the estates are usually to be found on the slopes of the range of volcanoes. Besides, there are a number of tea plantations in the mountain districts of Central Java and a small but steadily increasing number in East Java.

In addition to the estate cultivation, tea is also planted on a fairly large scale by the native population. As a rule, however, they do not prepare dry tea, but sell the freshly plucked leaves to the nearest factories.

After the passing of the Agrarian Law of 1870, whereby Government let out land on long leases, the industry in Java, which had become free from Government control in 1865, but was in a declining condition, began to improve. From the time of introduction of Assam hybrids in 1878, and pure Assam teas a little later, the industry increased steadily and rapidly. The present tea trade deals almost entirely with Assam tea and hybrids. The plant is hardy, and can be grown on different soils, at varying altitudes and under all kinds of climatic conditions. Assam tea thrives in Java until a height of 6,000-ft. above sea-level, and yields more than in lower altitudes. The success of a plantation depends largely on the supply or cheap labor, and in Java labor is both cheap and plentiful.

The method of plucking the leaves depends on the quality of tea required. Young leaves of fine quality yield a smaller quantity but command a high price; coarser leaves give a larger harvest at lower prices. Java planters appear to incline more to quantity than quality, which may explain the comparatively low prices of Java tea in the London market.

According to the latest returns published by the Dutch East Indian Bureau of

Census, 260 of the 285 tea estates from which figures for 1925 were obtained, were situated in Java (226 in West Java). The remaining 25 estates are all lying in Sumatra, and of these 17 in the East Coast province of that island.

The total planted area of the above 285 estates amounted to 241,260 acres. Of these 209,261 acres are in Java (190,041 in West Java) and 31,998 acres in Sumatra. The producing area, at the beginning of this year, was 194,531 acres in Java, and only 26,634 acres in Sumatra.

The production of Java tea during the last few years is as follows:—

1921	..	..	..	27,439,000 Kilos
1922	..	..	..	36,425,000 "
1923	..	..	..	41,148,000 "
1924	..	..	..	48,657,000 "
1925	..	..	..	44,664,000 "
1926 (estimated)	..	..	..	50,696,000 "

The decline in the quantity yielded in 1925 must be chiefly ascribed to the long and severe drought experienced in that year, as a result of which crops were exceptionally small.

The following table gives a comparative survey of exports of the leading tea producing countries of the world during 1910-1925:—

	Unit:—1,000 Kilos.			
	1910.	1915.	1920.	1925.
British India ..	113,772	137,490	121,157	156,821
Ceylon ..	82,571	97,793	83,831	94,274
Java & Sumatra ..	18,472	46,183	42,582	50,572
China ..	94,334	107,682	18,493	50,193
Japan ..	17,634	20,393	11,897	12,608
Formosa ..	10,250	10,527	10,000	9,473
Totals ..	337,033	420,068	287,960	373,941

Just as in other tea producing countries, the growing and manufacturing of tea in Java has shown an enormous development during the last 20 years. Old fashioned methods, whereby the leaves were rolled by hand or on primitive tables and dried above charcoal fires, belong to the past. They have been everywhere replaced on the estates by large factories fitted with the most modern machinery, chiefly so in order to be able to cope with the ever



A Modern Tea Factory in Java

increasing competition from other countries in the East.

Java teas are fermented. They possess great variety of flavor and distinct character of liquor. In the product grown on high altitudes the lighter shades of ruby tints with the aroma and flavor of Ceylon teas are found. From other estates come teas the character of which have developed directly from the Assam seed plantings from India. The teas grown on the estates on low grounds are lacking in flavor.

In many factories so-called "people's tea" is bought up (*i.e.* in the form of wet leaves) from the natives in the vicinity at a low price. This is specially the case in West Java, where in 1925 241,250 acres were planted with tea of this description, yielding nearly 52,700 kilos.

The improvement in tea manufacturing which has been noticeable during the last decades is largely due to the work of the Tea Experimental Station, Buitenzorg. This institution has, by giving constant advices, testing tea-seed and carrying out investigations both regarding cultivation and preparation, contributed to a large extent to the increase in yield and quality. Again the services of the Tea Expert Bureau at Batavia

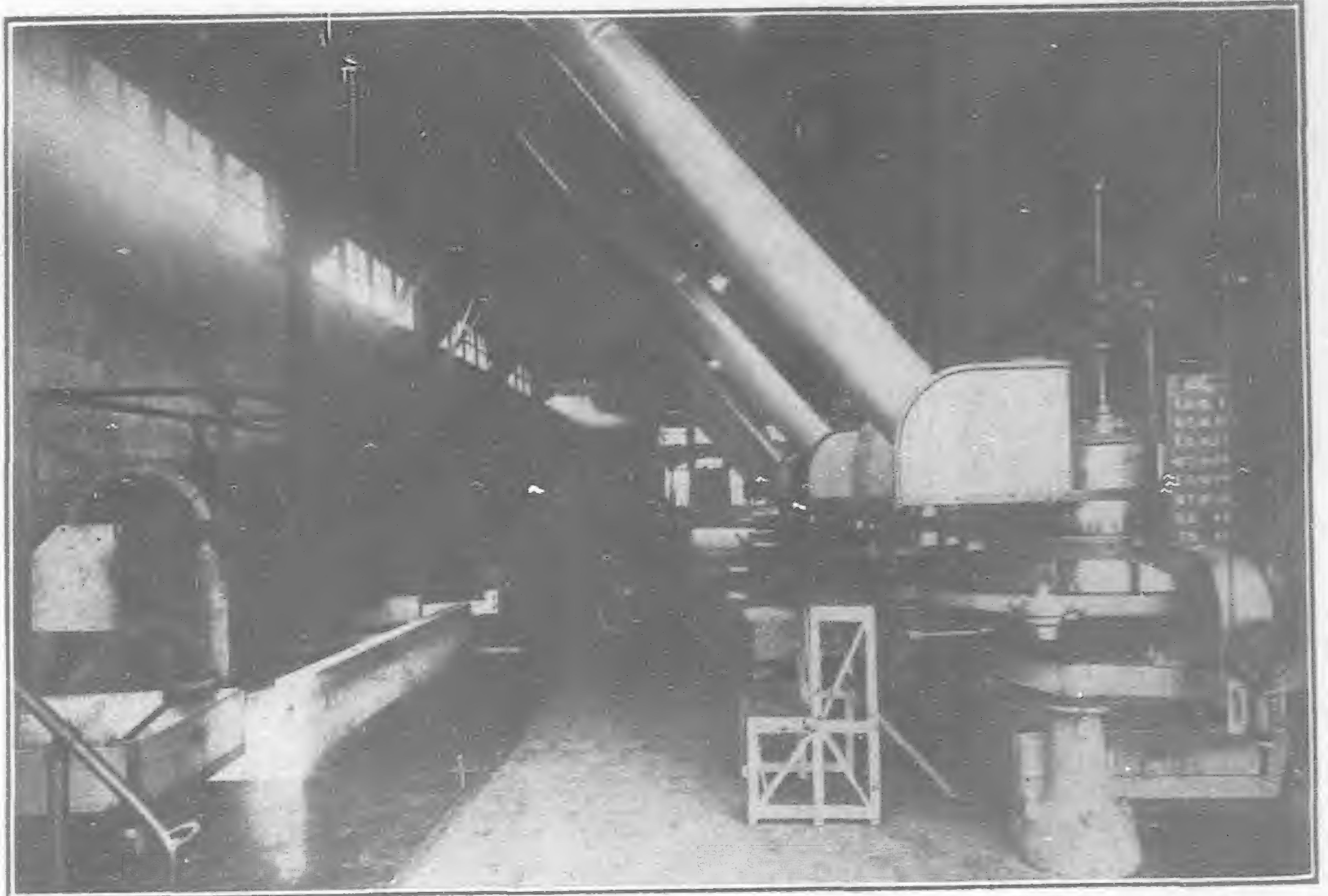
have done much towards improving the quality and trade of the product.

Grades of Java teas are classified nine in number, ranging from whole leaf to broken leaf and dust. The broken are again divided into:—broken orange pekoes (B.O.P.), broken pekoes (B.P.) and broken tea (B.T.). The leaf teas are:—orange pekoes (O.P.), pekoes (P.), pekoe souchongs (P.S.) and souchongs (Souch.). The tea refuse, the so-called "bohea," consisting of the stalks, is usually sold to the native population.

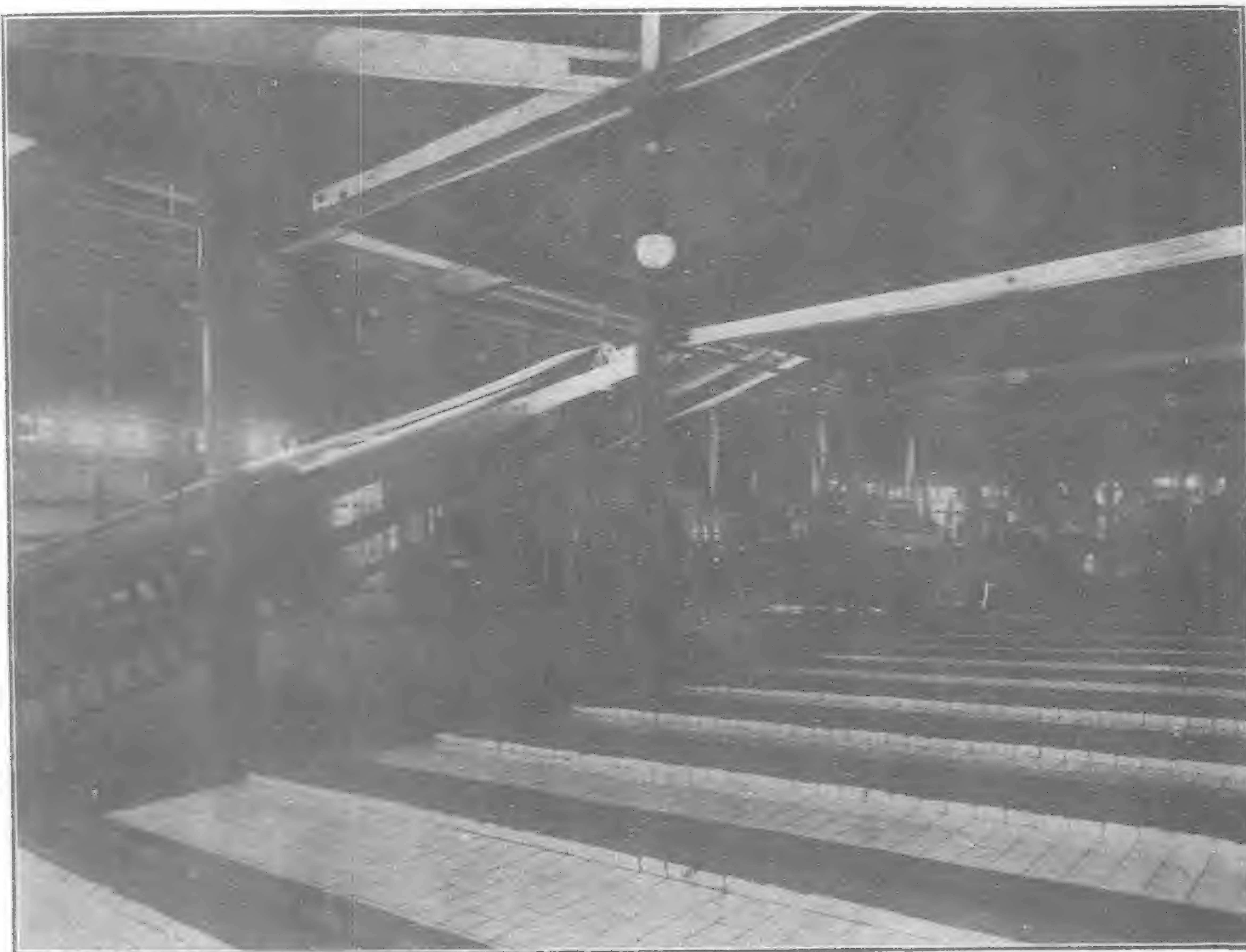
Java teas are sold on sample or fair average quality of the mark and season; in the agreement the estate-mark, grade, quantity and price are specified; further packing, time and place of delivery, and terms of payment. The Tea Buyers' Association at Batavia looks after the interests of the buyers.

A large amount of British capital is invested in tea in Java—it has officially been estimated that nearly 17 per cent. of the total area under tea in 1924 was British-owned. As a matter of fact, the foreign capital's active participation in the production has been of determining influence in the arrival of the Java tea industry at its present state of efficiency and importance.

(Continued on page 32).



(1) Battery of 5 double action tea rollers (on the right). These machines are filled with tea leaves through the white tubes constructed above them: About 330 to 440 lbs. of withered leaves are rolled at one time by each machine
(2) Two drum-shaped tea sorting revolving sieves (on the left)



Interior of a Modern Tea Factory

Note the Long Row of White Tiled Fermenting Floors, and the Transporting Belt bringing the Fresh Leaves to the Withering Loft

Industrial Machinery Market of China

Imports of Industrial Machinery in 1924 Represent Four Times the Volume of Pre-War Years—The United States Advances from Fourth to Second Place as a Supplier to this Market—Germany Has Almost Regained Pre-War Share in Market

TOTAL imports of industrial machinery into China during the year 1924 (the latest for which statistics are available) amounted to \$18,672,000, as compared with \$21,904,000 and \$41,387,000 for the years 1923 and 1922, respectively. Although such a comparison, with the years immediately preceding, may appear very unfavorable, a study of this trade in connection with that of pre-war years reveals some facts which are most encouraging.

The 1924 machinery import trade represents four times the average value for the pre-war years 1910 to 1913, inclusive, which amounted to only \$4,604,000. In view of the political disturbances which China has been experiencing, this showing is a tribute to the remarkable trade vitality of that country, and argues well for renewed activity when conditions become more favorable. This trade expansion is also indicative of the growing industrialization of China, which is taking place in common with other Asiatic countries.

World Competition for the Machinery Trade of China

A study of the participation of the machinery producing countries of the world for a share of the Chinese trade reveals some very significant developments. In 1924 Great Britain, the principal supplier to this market, shipped to China industrial machinery valued at \$5,519,384, followed by the United States and Canada with a total of \$3,859,731, Japan with \$3,520,916, and Germany with \$3,179,075. The pre-war situation, as revealed by average for the four years 1910 to 1913, inclusive, were as follows: Great Britain, \$1,730,050; Germany, \$847,736; Japan, \$409,224; and the United States and Canada, \$331,620. In comparison with this pre-war period shipments from both Great Britain and Germany have increased more than threefold, those from Japan nearly ninefold, while those from the United States have risen almost twelvefold, or more than the shipments of any other competing country.

United States Advances to Second Place as Source for Machinery

The standing of the principal suppliers to this market prior to the World War, as indicated by the average percentages shared during the years 1910 to 1913, inclusive was as follows: Great Britain, 37.9 per cent; Germany, 18.3 per cent; Japan, 8.9 per cent; and the United States, 6.8 per cent. The relative participation in the trade of 1924 gives the following order: Great Britain, 29.6; United States and Canada, 20.7 per cent; Japan, 18.8 per cent; and Germany 17 per cent. The United States has thus moved to second place, and Germany has dropped to fourth position, although it is close to Japan.

The industrial machinery imports of China are becoming more largely controlled by Great Britain, the United States, Japan, and Germany, and less widely distributed among other nationals. The percentages shared by "all other countries" in the years 1910 and 1911 were 26.8 per cent and 29 per cent, respectively, and rose as high as 35 per cent in 1912, whereas the portion so shared in 1924 amounted to only 13.9 per cent.

Total value of imports of industrial machinery into China by countries of origin, including all machinery except agricultural, embroidering, knitting, and sewing machinery, and each country's percentage of total trade.

[Values in thousands of dollars]

Year	United States and Canada		Great Britain		Japan		Germany		Total value, including all other countries.
	Value	Per cent.	Value	Per cent.	Value	Per cent.	Value	Per cent.	
1910	\$641	8.9	\$2,662	36.9	\$686	9.5	\$1,296	17.9	\$7,220
1911	248	5.8	1,515	35.5	302	7.1	964	22.6	4,265
1912	133	3.8	1,305	37.5	287	8.3	524	15.1	3,481
1913	304	8.8	1,439	41.7	361	10.5	607	17.6	3,447

Year	United States and Canada		Great Britain		Japan		Germany		Total value, including all other countries
	Value	Per cent.	Value	Per cent.	Value	Per cent.	Value	Per cent.	
1914	456	8.4	2,512	46	571	10.5	708	13	5,456
1915	453	16.6	1,181	43.2	517	18.9	4	0.1	2,733
1916	852	17.6	1,857	38.4	1,573	32.5	7	0.1	4,844
1917	1,453	23.4	1,698	27.6	2,492	40.4	—	—	6,162
1918	3,012	30.4	1,655	16.7	4,498	45.4	—	—	9,904
1919	8,907	44.7	2,883	14.5	5,011	25.1	—	—	19,916
1920	15,105	54.1	6,484	23.2	4,622	16.5	82	0.3	27,943
1921	16,112	38.6	16,163	38.7	5,428	13	731	1.8	41,725
1922	9,657	23.3	18,542	44.8	7,586	18.3	2,096	5	41,387
1923	3,482	15.9	8,231	37.6	5,049	23.1	2,330	10.6	21,904
1924	3,860	20.7	5,519	29.6	3,521	18.8	3,179	17	18,672

¹ The haikwan taels of the official Chinese customs statistics have been converted into dollars upon the following bases: 1910, \$0.66; 1911, \$0.65; 1912, \$0.74; 1913, \$0.73; 1914, \$0.67; 1915, \$0.62; 1916, \$0.79; 1917, \$1.03; 1918, \$1.26; 1919, \$1.39; 1920, \$1.24; 1921, \$0.76; 1922, \$0.83; 1923, \$0.80; 1924, \$0.81.

The United States and Japan both enjoyed a largely increased share of the Chinese machinery trade during the years of the World War, and their present participation, as indicated by an average for the years 1922 to 1924, inclusive, is almost identical. The fact that Germany has almost regained its average pre-war share of the Chinese imports is also significant. These developments are set forth graphically in the accompanying chart.

Market for Propelling Machinery Shows Strength

Imports of propelling machinery (boilers, turbines, etc.) into China amounted to \$1,574,928 in 1924 as compared with \$1,233,293 in 1923, representing a gain of almost 28 per cent. The growth in the market for this type of machinery is forcefully shown when compared with that of the pre-war years of 1911 to 1913 inclusive, when the average imports of propelling machinery amounted to only \$397,102, or about one-fourth of the 1924 volume. This growth in trade is shown in detail in the table that follows.

Imports of propelling machinery (boilers, turbines, etc.) into China, years 1911-1913 and 1922-1924, inclusive.

Year	United States and Canada		Great Britain	Sweden	Germany	Japan	Belgium	Total value, including all other countries
	Value	Per cent.						
1911	\$28,918	—	\$203,028	—	\$16,005	\$17,382	\$1,903	\$291,580
1912	19,849	—	290,783	—	31,084	31,060	3,215	419,130
1913	32,094	—	296,909	\$864	74,916	33,161	19,263	480,596
1922	264,266	15.302	1,249,644	15,302	237,710	180,578	6,342	2,068,966
1923	278,584	18.3128	575,622	47,414	183,128	82,164	17,066	1,233,293
1924	239,685	14.572	804,631	228,472	116,042	73,214	33,195	1,574,928

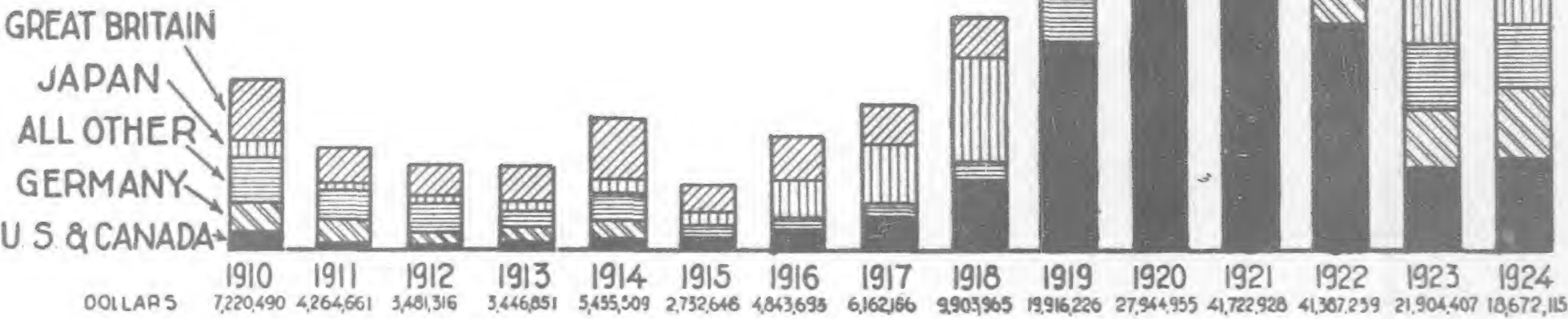
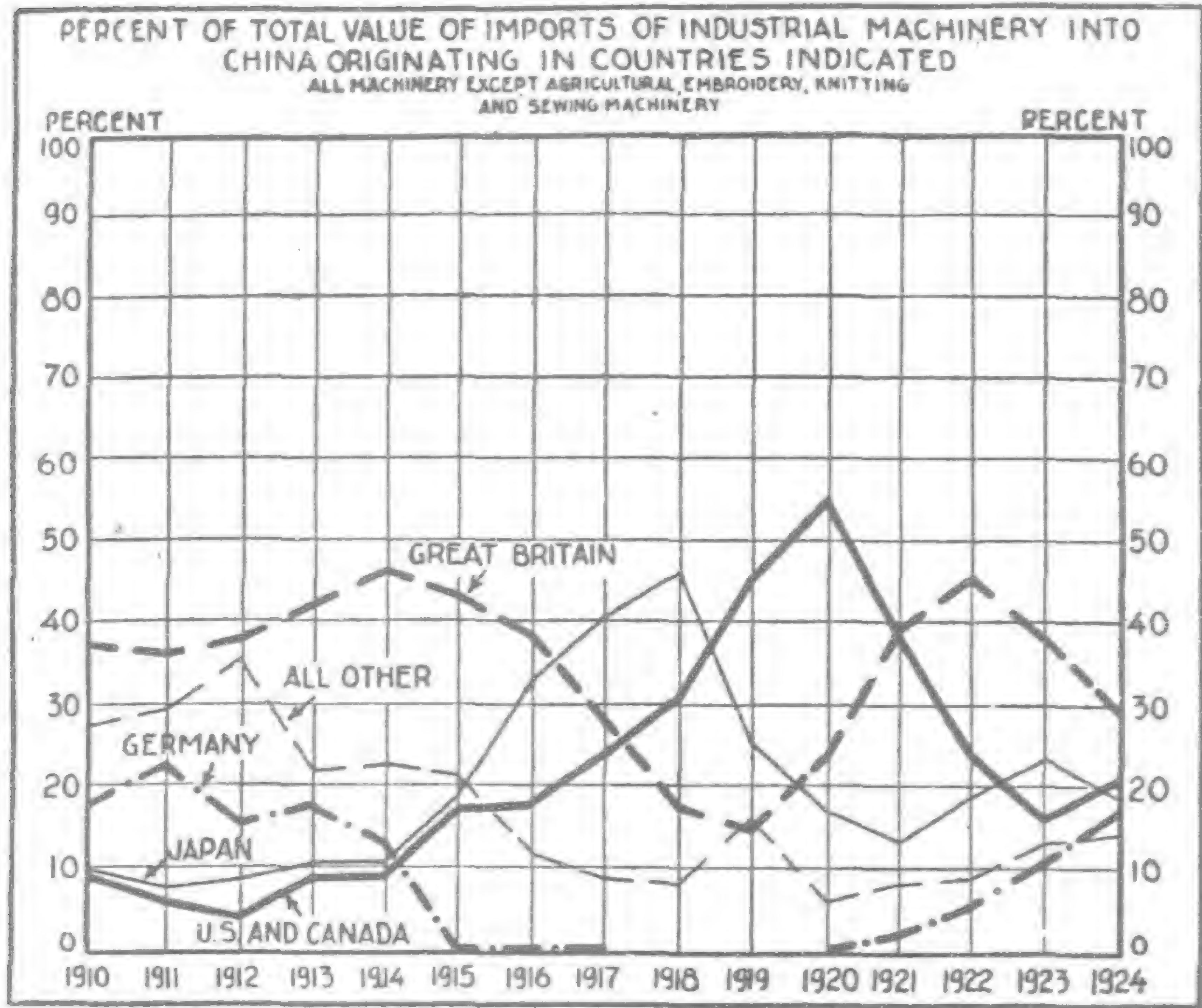
The increased participation of the United States in China's market for propelling machinery is also significant, for its share had more than doubled in 1924 as compared with its average share for the years 1911-13, inclusive. The British participation, on the other hand, has decreased from an average of 67 per cent. for the pre-war period to 51.1 per cent. in 1924. The growing share of Sweden in this field is also noteworthy, having increased from nothing in the years 1911 and 1912, and only 0.001 per cent. in 1913, to 14.5 per cent. in 1924.

Textile Machinery Imports Still Far Above Pre-war Levels

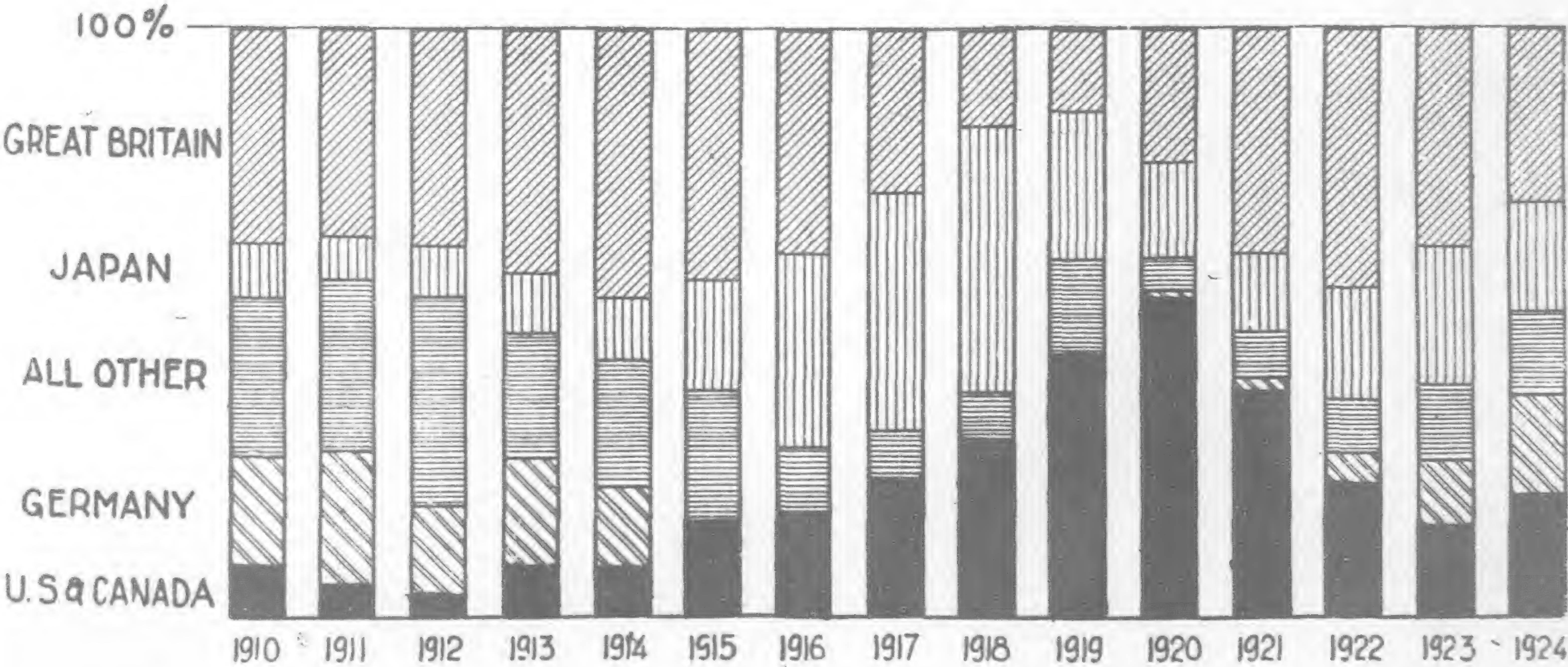
Imports of textile machinery have been decreasing steadily from the unusual levels of the war and post-war boom periods, and in 1924 the total value of such imports, namely \$4,756,336, represented less than half of the total for 1923. Nevertheless, the 1924 imports of this class of machinery represented more than 11 times the average value of the imports for the pre-war period of

TOTAL VALUE OF IMPORTS OF INDUSTRIAL MACHINERY INTO CHINA
ORIGINATING IN COUNTRIES INDICATED

ALL MACHINERY EXCEPT AGRICULTURAL, EMBROIDERY, KNITTING AND SEWING MACHINERY
VALUE IN DOLLARS



PERCENTAGES



1911 to 1913, inclusive, which amounted to only \$389,301. These developments are shown more in detail in the following table :

Imports of textile machinery into China, years 1911-1913 and 1922-1924, inclusive.

Year	United States and Canada	Great Britain	Japan	Germany	Belgium	France	Total value, including all other countries
1911...	\$4,655	\$156,802	\$39,103	\$9,823	—	\$487	\$215,529
1912...	7,315	227,389	37,169	370	\$4,255	38	339,375
1913...	1,909	490,670	82,125	15,995	9,694	332	612,999
1922...	6,565,335	12,592,619	5,581,969	261,984	121,184	31,324	25,339,307
1923...	746,826	4,921,891	3,646,227	227,609	24,886	183,205	9,867,534
1924...	491,531	2,129,258	1,747,265	184,721	69,385	55,757	4,756,336

Competition in Textile Machinery

The share of the United States and Canada in China's imports of textile machinery increased from approximately 8 per cent. in 1923 to 10 per cent. in 1924, whereas the share of Great Britain decreased from 50 per cent. to 54 per cent. The comparison becomes more striking when based upon pre-war years, for the American participation has increased from an average of only 1.6 per cent. for the years 1911 to 1913, inclusive, to 10 per cent. in 1924, but that of Great Britain has decreased from an average of 73 per cent. for the pre-war period to approximately 45 per cent. in 1924.

Of outstanding importance in the textile machinery market of China is the growing participation of Japan, which has increased from an average of only 14 per cent. for the pre-war period to 37 per cent. for each of the years 1923 and 1924, so that this country now ranks second only to Great Britain as a source for such equipment.

Market for Machine Tools Closely Contested

China imported in 1924 machine tools worth \$529,894, as compared with \$393,590 in 1923, and an average of only \$21,268 for the pre-war period 1910 to 1913, inclusive. The fact that this type of machinery is only in demand where there is a comparatively high industrial development, lends added significance to this growth in trade and shows clearly the progress that China has made along these lines.

This market for machine tools is closely contested and the relative importance of the principal countries enjoying a share in this trade varies considerably from year to year. In 1924 the United States ranked first, supplying 29 per cent. of the total imports, with a value of \$153,094, closely followed by Japan with a share of nearly 28 per cent. and an import value of \$147,017. The situation was quite different in 1923 and 1922, when Germany held first rank, with a share of 44.5 per cent. and 31 per cent., respectively, and the United States was second in importance in 1923 and shared third place with Great Britain in 1922. Both of these countries were surpassed in that year by Japan.

Position of Countries in Machine-Tool Trade

Comparing this situation with pre-war experience, Great Britain has lost the preeminent position which it held in this particular market, while the United States and Japan have gained considerably. The participation during the year 1910 to 1913, inclusive, was as follows : Great Britain, 28 per cent. ; Germany, 20.4 per cent. ; Japan, 11.2 per cent. ; and the United States, 2.6 per cent. The status of the various nationals sharing in this machine-tool trade is set forth in greater detail in the following tables :

Imports of machine tools into China, years 1910 to 1924, inclusive.

Year	United States and Canada	Great Britain	Germany	Japan	Total value, including all other countries
1910...	—	\$3,650	—	—	\$15,085
1911...	\$400	6,304	\$3,583	\$694	18,022
1912...	98	4,237	4,651	3,043	14,525
1913...	2,754	8,842	11,073	7,471	37,440
1914...	7,371	16,107	14,209	17,267	64,931
1915...	9,606	5,612	—	26,098	45,143
1916...	18,488	8,510	—	39,295	77,245
1917...	42,212	1,292	—	165,289	214,646
1918...	183,419	3,273	—	250,682	439,876
1919...	275,024	70,163	—	308,574	694,796
1920...	379,167	137,687	6,359	392,629	943,721
1921...	211,149	224,867	25,899	222,507	714,656
1922...	70,818	71,733	169,638	127,956	546,001
1923...	71,148	59,326	175,242	62,636	393,590
1924...	153,094	57,866	128,198	147,017	529,894

Percentage of China's machine tool imports as shared by competing countries, years 1910-1924, inclusive.

Year	United States	Great Britain	Germany	Japan	Other countries
1910...	—	24.2	—	—	*75.2
1911...	2.2	35	19.9	3.9	39
1912...	.7	29.2	32.0	21	17.1
1913...	7.4	23.6	29.6	20	19.4
1914...	11.4	24.8	21.9	26.6	15.3
1915...	21.3	12.4	—	27.8	8.5
1916...	23.9	11	—	50.9	14.2
1917...	19.7	.6	—	77	2.7
1918...	41.7	.7	—	57	.6
1919...	39.6	10.1	—	44.4	5.9
1920...	40.2	14.6	.7	41.6	2.9
1921...	29.5	31.5	3.6	31.1	4.3
1922...	13	13.1	31.1	23.4	19.4
1923...	18.1	15.1	44.5	15.9	6.4
1924...	28.9	10.9	24.2	27.7	8.3

*Nearly 66 per cent. is listed as coming from Russia and Siberia by land frontier.

Market for Brewing, Distilling, and Sugar Machinery

Imports of machinery for brewing, distilling, sugar manufacture, etc., have increased greatly, according to the Chinese customs returns for this general class of equipment. In 1924, total imports of machinery falling under this classification were valued at \$1,126,835, as against \$82,550 and \$223,111 for the years 1923 and 1922, respectively. An even greater gain is seen in comparing with the pre-war years 1913, 1912, and 1911, when total imports were \$35,849, \$24,351, and \$29,175, for the respective years.

The principal sources for machinery coming under this head vary greatly from year to year. In 1924 the most important supplier was Germany, with a total value to its credit of \$532,185, followed by Belgium with \$302,872, and the United States with \$274,961 ; whereas during the preceding years the order was as follows : 1923, United States, \$69,264 ; Japan, \$9,841 ; 1922, Japan, \$159,281 ; United States, \$48,153. As already indicated, imports of this class of equipment were small prior to the World War, the principal source being Great Britain in the years 1913 and 1912, with totals of \$17,770 and \$10,083, respectively, and Germany in 1911, with imports valued at \$19,120.

Advance of the Java Tea Industry

(Continued from page 29.)

In the following table are shown the exports of tea, by countries, from Java during the last five years :—

Countries to which exported.	Unit :—1,000 Kilos.				
	1921.	1922.	1923.	1924.	1925.
Holland and order	11,277	9,022	11,554	12,418	8,932
Great Britain a.o.	6,619	10,486	12,406	19,547	17,943
Germany a.o.	104	75	284	190	117
France a.o.	18	114	233	299	181
Other European	4	65	134	118	227
U.S. of America	3,105	4,187	3,473	2,601	2,817
Canada	39	453	694	361	330
South America	—	36	372	224	202
British South Africa	3	47	163	500	279
British India	17	232	273	304	264
Singapore f/t.	70	166	214	156	254
Australia...	9,786	10,135	11,011	11,165	10,440
Japan	85	11	—	2	3
All other	97	50	195	200	861
Totals	31,307	35,079	40,856	48,085	42,850

The above figures are interesting : the steady increase in exports during the years 1921/1924 show, most strikingly for Java, a distinct set-back during the period 1925. To that end two agents have chiefly contributed, first and foremost the prolonged and severe dry weather, which seriously curtailed growth of leaf for a period much above normal, and the second, though to a less yet by no means negligible degree, was the reduced manufacture and offering for export of low quality and undesirable No. 2 grades. The factor just mentioned has had a marked influence, though to a less extent than the former, on the total quantity shipped abroad.

As the production of tea can only increase slowly, whilst the consumption rises rapidly, whereby the world stocks decrease considerably, the statistical position of the product may be regarded as extremely healthy.



Tytam By-wash Reservoir (Hongkong Island)



Building New Filter Beds on Hongkong Island

The Water Supply of Hongkong

The "Shing Mun" Valley Scheme

(CONTRIBUTED)

Introduction

THE problem of the supply of an adequate quantity of water for Hongkong has been one that has led to many discussions in the Legislative Council Chamber and in the local newspapers. Recently considerable attention has been given to what is known as "the Shing Mun Valley Scheme." It is the purpose of this article to explain the technical details of some of the work that has been carried out in connection with that scheme. In order, however, that the reader may understand the many difficulties connected

with a general supply of water sufficient for the inhabitants of the island of Hongkong and those on the Kowloon peninsula across the harbor, reference will be made to other water works in Hongkong.

It is generally believed that the correct translation of the Chinese words "Hongkong" into the English language is "Fragrant Streams." It seems probable that European trading vessels first visited the island in order to obtain pure water. No doubt when negotiations were being carried on with the Canton Viceroy, about ninety years ago, concerning the cession of some



A Corner of Tytam Tuk Reservoir (Hongkong Island)



Building New Filter Beds, Hongkong Island (Below Wong Wei Chung Gap)

Tytam Tuk Reservoir (Hongkong Island) and the Open Sea
See from about 800-ft. above

island at the mouth of the Canton river as a center for European traders, the negotiators had in mind, not only the splendid harbor, but also the "Sweet waters" on the island when they suggested Hongkong as a suitable place.

It may be of interest to mention that the Portuguese traders of the sixteenth century appear to have overlooked that importance of a good water supply when they settled at Macao. The fact that fresh water must be carried to Macao by junk or water-boat from neighboring islands must always be a great disadvantage for the development of that port.

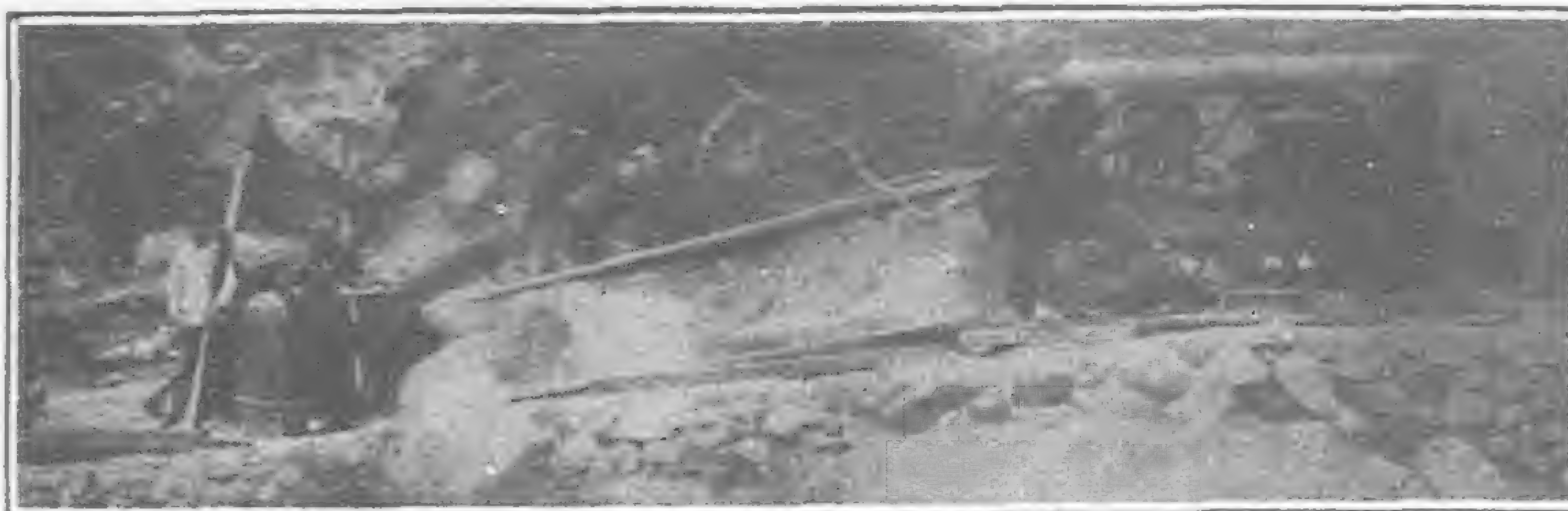
It is easy, even in these days when engineering skill has transformed the general appearance of the island of Hongkong, to trace out the courses of the natural nullahs and hillside streams which supplied the ship's crews who came to Hongkong with water needed for long voyages. Many of the natural streams are now guided down nullahs made of granite stones and concrete; water is to be seen streaming down the hillside even in the dry season.

In the early days of the new Hongkong, say from 1841 until 1860, the primitive method of taking water from the hillside streams direct to the houses was in vogue. The streams were tapped above the built area and led into small tanks from which the water ran to any particular house. The water supply was then a matter that concerned only the householder and not the Government. In the early records, we read that wells were sunk in some places. There was water in abundance for the small population of about 5,000 Chinese inhabitants which occupied Hongkong in 1841. These consisted of families chiefly engaged in piracy, a profession which is still practiced by some of their descendants. They took their water from the hillsides.

Gradually the population of Hongkong increased. It grew from 5,000 to about 50,000 in 20 years; nowadays it is generally believed that the population of Hongkong, Kowloon and the New Territories is nearly one million. Under ordinary circumstances the problem of a water supply for a million people is not an easy one. The circumstances in the case under consideration are by no means ordinary.

As the population of Hongkong has increased, so have ideas about the quantity of water needed per head of population become more generous. Modern houses have a bath room for each bed-room and modern notions of hygiene stimulate a more frequent use of baths. On a hot summer's day in Hongkong, it is not unusual for people to bath as often as three or four times a day. After any physical exertion a bath is almost a necessity during the summer months.

Another demand for water has been caused by the creation of modern industrial plants. The use of machinery invariably involves a supply of water. Hongkong has become not only a great shipping port, but a manufacturing center. For example there is on the island of Hongkong a paper mill which



Air Compressor Used at Shing Mun

The paper mill is by no means the only local industry that uses great volumes of water. Hongkong is famous for its sugar works. For the transformation of raw sugar into the manufactured article that is exported to all parts of the Far East from Hongkong, large quantities of water—about 2,000 tons a day—are required. The dockyards, the electric power stations and the shipping all use a great deal of water.

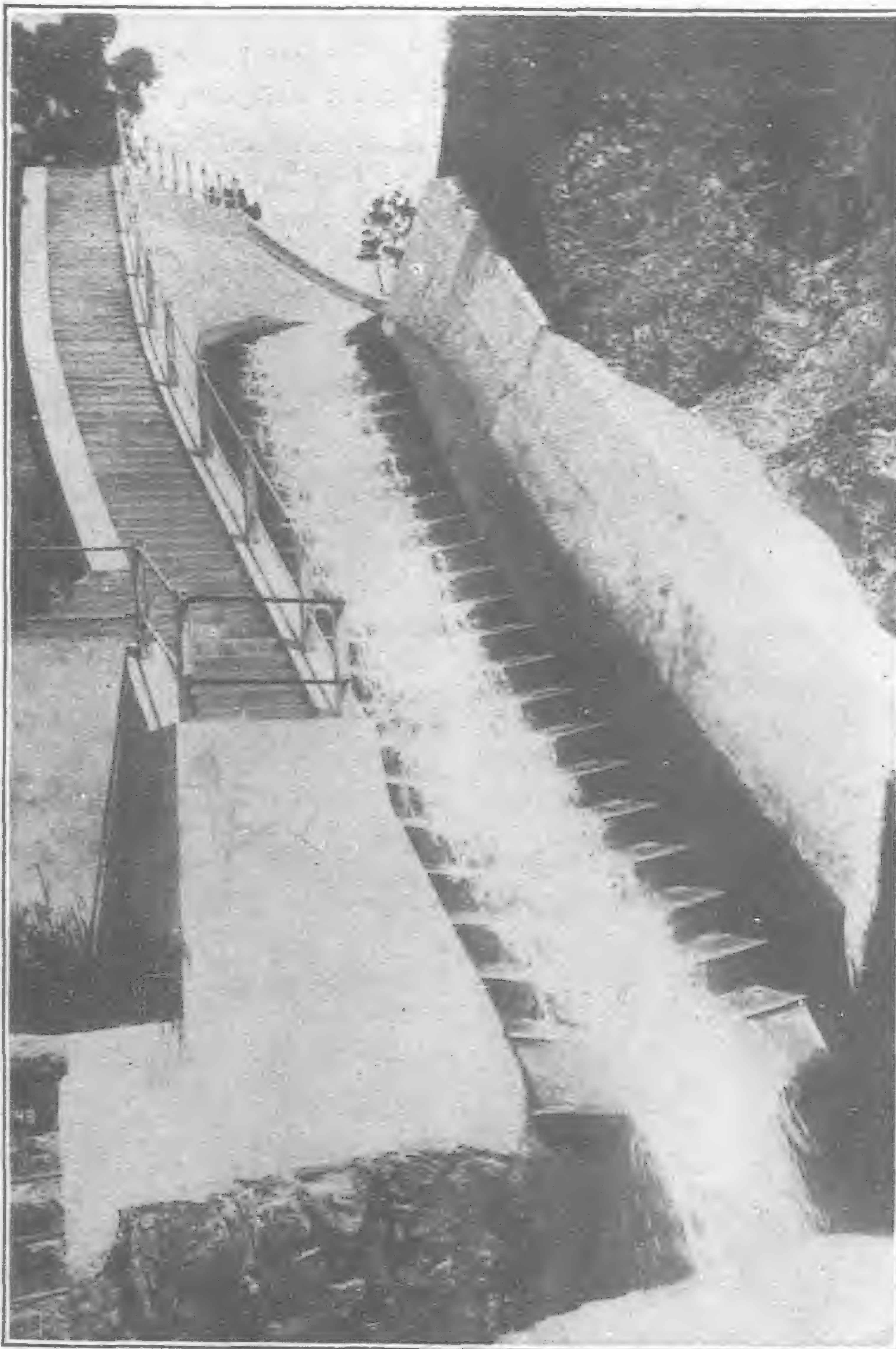
Thus we begin to realise that the problem of the Water Authority is not simply that of supplying water needed by a large population for domestic purposes, although that becomes more and more difficult as modern ideas of hygiene and sanitation spread. The problem is complicated by the demand from industrial plants and the great ships that come alongside the wharves or signal for water boats so that their capacious tanks may be filled with water collected in Hongkong. The demand from these vessels alone comes to about half a million gallons daily.

Expectations Exceeded

No one in 1841 imagined that the island with 5,000 inhabitants without wharves or go-downs would so rapidly develop into one of the biggest ports of the world. In those days, no one thought that people would herd together in millions in big cities. Modern industrial development has created all sorts of new problems, not the easiest of solution is that connected with water supply.

Even a few years ago, an experienced Governor of Hongkong under-estimated the rapid increase there would be in the local demand for water. He had a great faith in the future of the place and he had had many years of experience of local conditions. In 1918, he officially opened the capacious Tytam Tuk Reservoir. He then made a speech in which he stated that this latest addition to the storage capacity of Hongkong would be sufficient to meet all requirements for the next 15 years. It is generally agreed that the statement reflected the opinion of the general public at the time although there were those who thought otherwise. Within five years of the opening of Tytam Tuk, the local Water Authority had good reason to be gravely concerned about the immediate future and the Hongkong Government was considering schemes for a further and much greater water supply.

The annual rainfall in the Hongkong district varies considerably in amount. An engineer of considerable experience of local conditions, Mr. G. Gibbs, M.INST.C.E., recently



New Catch Water, Just Entering Tytam Tuk Reservoir (Hongkong Island)

contributed an interesting statement on this subject to the *Hongkong Daily Press*, (November 10th 1926). He pointed out that, the annual rainfall (in inches) varies considerably. "Fortunately," he wrote "we have not since 1918 had anything like so dry

a year or series of years as past experience proved we may expect sooner or later. The driest year since 1918 was 1922 with 69 inches, in 1895 we had only 46 inches and for the three years 1899-1901 a mean of only 67 inches a year. . . . Sir Henry May's



A View of Tytam Tuk Reservoir and Dam at Low Water
(Hongkong Island)



Tytam Tuk Reservoir Masonry Dam Wall (Overflowing)
(Hongkong Island)



The Overflow of Tytam Tuk Reservoir



View of Tytam Tuk Reservoir (Hongkong Island) Showing
Dam from Reservoir Aspect



A View of the Motor Road Along the Top of the Masonry
Dam of Tytam Tuk Reservoir



A Typical Tunnel Gang with European Foreman
Miner at Top-Right Hand Side

statement should be a warning of the danger of prophesying but, with a rainfall table for the last 40 years before me, I venture to predict that within the next five years we shall have in Hongkong a water famine which will remind us of the "good old times" prior to 1918.

The present daily demand may be taken as roughly nine million gallons for the island. In Kowloon, the total demand is from $2\frac{1}{2}$ at 3 million gallons a day, including the demand of the ships. In the past, during the dry season, there have been curtailments of the water supply to the central parts of Hongkong and sometimes also in Kowloon the supply has been limited in the very dry periods.

On occasions the supply has been reduced to a service of two hours a day and in extreme cases only street fountains have been available.

The water famine of 1902 was probably the worst experienced. At that time water was brought across the harbor in lighters and the people lined up in columns regulated by police and soldiers. An ex-Director of Public Works, Mr. Chatham has often related to the writer his anxieties about water supply during that time. His experience made the engineers of this period anxious to arrange that any repetition shall be impossible.

Nowadays the system of curtailed supply still is used in emergencies. Even with such restrictions, there is always ample water for drinking purposes. It is, however, natural that all of the inhabitants of Hongkong should desire to have a supply of water that will make curtailments very rare.

It was a relief to many when what is known as the Shing Mun Valley Scheme was suggested as a possibility, of avoiding water famine in the future. It was, from an engineering point of view, a bold and interesting plan to solve an urgent problem. It involved, obviously, a heavy expenditure of money. There are however some things in life which are necessities, and while we naturally wish to obtain them at as low a price as is possible, yet if we must pay a big price for them, the expenditure is worth it. After all, expenditure on water supply is an investment which secures good health for the community. The more



Power House at Central Depot Midway between North and South Tunnel

our knowledge of the cause of various tropical diseases extends, the more essential does a pure and ample supply of water appear.

The New Scheme

The "Shing Mun" Valley is not situated on the island of Hongkong. It is on the mainland, in what is known as the New Territory, beyond Kowloon. That territory was leased to the British in 1897 for a period of ninety-nine years. The original idea of the "Shing Mun Valley Scheme" came from Mr. R. M. Henderson, M.INST.C.E., M.I.W.E., the Executive Engineer in the Hongkong Public Works Department who was at that time and still is responsible to the Director of Public Works for the local water supply. With Mr. Henderson has been associated Mr. A. B. Purves, A.M. INST.C.E., and these two engineers not only formulated the original scheme but have worked out practically all of the details described below. The cross-harbor pipe line was perhaps the only exception; in that matter Mr. W. Fairley, M.INST. C.E., of London was consulted.

Usually in a scheme of the magnitude of these proposals a consulting engineer from London visits the place and makes a report. It says a great deal for the personnel of the Hongkong Public Works Department that in this case practically the whole scheme has been worked out in detail without outside assistance. When the plan was first suggested (1921)

Mr. T. L. Perkins, M.INST. C.E., was Director of Public Works.

Incidentally it may be mentioned that the late Mr. D. Jaffé, M.INST.C.E., a local Public Works Engineer worked out all the details of the Tytam Tuk waterworks in Hongkong

extension a scheme which was completed in 1918.

Mr. H. T. Creasy, M. INST.C.E., A.N.I.M.E., is now Director of Public Works. In common with his predecessors in office, Messrs. Chatham and Perkins, he must have had the anxiety of the possibility of a very dry season and a limited water service. He is a member of the local Executive and Legislative Councils and carries the responsibility for all public works (including Water Supply) in Hongkong.



Type of Compressed Air Drill Used at Face



Power House at South End of South Tunnel



Rock Excavation at Approach to South Tunnel



South Approach to South Tunnel

It is very hard for the non-technical man to realise the immense amount of work involved and the value of the knowledge essential for working out the details of such a complex plan as that of the Shing Mun Valley scheme. Experts from Great Britain charge what seem to be enormous fees for their advice. A prominent consulting engineer visited Hongkong in connection with the harbor problems. His fee was about £ 6,000, although he was in Hongkong for only two or three weeks. Of course he did a great deal of work in consultation with his partners in London before sending in a report. It is not so much the amount of time spent on such investigations, although that is much more than is usually imagined by non-technical men, but it is the long years spent in acquiring the "Know how" that enables experts in any profession to justify high fees. It is certain that if any Consulting Engineer from England had come out to Hongkong in order to advise the local Government about the water supply the expense would have been much more than has been the case. Which reminds us how essential it is to have well qualified engineers in any Public Works Department.

The Catchment Area

The area of British territory on the mainland opposite the island of Hongkong is about 300 square miles. Shing Mun is by far the biggest valley in that territory. The Water Scheme of that name is so comprehensive that it involves a catchment area of about 13 square miles. In the dry season, there is always a stream running down the valley; after heavy rains the stream is swollen until it may be described as a rushing torrent. This stream is locally referred to as the Shing Mun River. In the driest season, it is estimated to yield a daily supply of 17 million gallons when the Scheme is fully completed. The imagination of the engineering expert saw in this stream and its locality the final solution of all of the water-supply problems of Hongkong. He felt convinced that dams could be built, tunnels bored through the granite hills, pipes laid to Kowloon and if necessary, across the harbor.

He knew that it would all cost a great deal of money, but he could definitely promise that the Shing Mun Valley and the reservoirs would supply to Hongkong sufficient water for any

probable developments for very many years. He must have felt inclined to say that the supply would be capable of meeting any demand at any time.

When the Shing Mun Valley Scheme was first suggested Hongkong was in a state of great prosperity. The public revenue had been increasing and had assumed proportions unbelievable ten years earlier. Despite the recent experiences of certain disconcerting labor troubles, there was a general feeling of optimism about the immediate future. The Chinese community had a perfect faith in the increasing prosperity of Hongkong. Millions and millions of dollars had come to the local share and property market from Chinese investors. Rapidly though the architects and contractors built houses the demand was always greater than the supply. As was inevitable up went the cost of building and the house rents, but still people paid extravagant prices to get what they wanted. It may be true to say that the "boom" was very largely artificial and that, under any circumstances, there was sure to be a reaction as there is always with any boom. All that needs to be recorded is that the reaction came with a force that has affected every local problem in Hongkong. In June 1925, there commenced a period that adversely affected, not only the public revenues but the prosperity of almost every individual in Hongkong.



Cable Transport from Road to Tunnel Face

The position of the "Shing Mun Valley Scheme" when this great calamity came upon Hongkong was as follows. Rough plans of the complete scheme had been prepared, and contracts for the greater portion of the first section had been let. Tenders had been called by the Public Works Department of Hongkong in 1924 for the tunnels, etc., and on 25th of November of the same year this contract was awarded to the well-known firm of Sir W. G. Armstrong, Whitworth and Co., Ltd.

THE WORK ACCOMPLISHED.—The scheme has involved, not only engineering problems, but questions of finance. For the first time in its history extending over 85 years the Colony of Hongkong is to raise a loan, or public debt to finance an engineering scheme. That practice is, of course, quite common in other parts of the world. Almost every municipality in Great Britain carries out such revenue producing public works as water supply, etc. by means of loans.



Mr. P. R. Warren and Foremen at Tunnel 4 Entrance



Transporting Part of Oil Engine up the Hill

It may be as well to enumerate some of the work already accomplished in connection with this scheme for adding to supply of water for Hongkong.

The following is a complete list of the contracts that have been let in connection with the Shing Mun Valley scheme. Nearly all of them have now been completed. They are:—

- (a) To Messrs. Sir William Armstrong, Whitworth and Co. Ltd. of Newcastle-on-Tyne, England, the north tunnel, the south tunnel and the south conduit.
- (b) To Ng Wah, Hongkong, the intake, temporary conduit and north conduit and the Piper's Hill Service reservoir.
- (c) To Messrs. Trollope and Colls, a reception reservoir.
- (d) To Chun Sing, an access road 16-ft. wide and 1.92 miles long.
- (e) To Messrs. W. Paterson Ltd. London, the filter beds.
- (f) Messrs. Stewart and Lloyd's the 24-inch steel pipe contract.

It will be realised that these contracts fulfill only a portion of the original and complete scheme and for various reasons there seems to be at present no immediate prospect of doing more. Engineers interested in the matter must feel a natural sense of disappointment that circumstances over which they have had no control have prevented them from continuing the work until the whole scheme is completed.

It would, however, be a great mistake to suppose that the effort already made has been of no value. The full scheme completed would have made certain an almost indefinite water supply for Kowloon and the island of Hongkong. Under existing conditions, Kowloon alone will benefit, but Kowloon will now always have a full supply of water.

Financing the Scheme

The following extracts from the Budget speech made by the Hon. Mr. Southorn, Colonial Secretary of Hongkong, on October 15th, 1926, will enable the reader to realise that the problem of financing this scheme has been the subject of anxious thought.

It was decided in 1926 to increase the charges made for water supplied to shipping. The Hon. Colonial Secretary said: "The Colony has recently expended very large sums in increasing and improving the water supply and it is felt that these increased charges are fully justified. The rates for water for shipping at present charged in Hongkong are far below those in force in most of the other Far Eastern Ports. The Shing Mun Valley supply is beyond reproach both in quantity and in quality and the charge will be only \$1, per 1,000 gallons as against \$2. and Rs. 5 per 1,000 gallons in Singapore and Colombo respectively.

That will, of course, increase the revenue of the Colony—possibly by \$90,000 a year."

Turning to the problem of paying for the work already accomplished, the Hon. Colonial Secretary announced that the local Government had decided to raise a loan for the purpose. There are,

of course, many precedents for this new policy. The remarkable water supply schemes in Egypt were financed with money raised by loans.

The Hon. Colonial Secretary, in the course of his speech said that the local Government proposed to charge "the whole of the Shing Mun Valley Scheme to a loan to be raised at an appropriate time and meanwhile to finance the Scheme by borrowing. The amount which will have been expended on the Scheme up to the end of 1926 is estimated at \$ 2,050,000, a further sum of \$ 800,000 is required in 1927 and about \$ 505,000 in 1928.

"This will complete the first portion of the Scheme and place the water supply of Kowloon and for shipping beyond any probability of shortage for an indefinite period. It does not provide for bringing the water across the Harbor to Hongkong Island and the Government does not feel justified at the present time in proceeding with this portion of the original scheme.

"The loan proposal is at present before the Secretary of State and the Government is awaiting his decision. If the proposal is approved a sum of \$ 2,050,000 will be made available to meet the estimated deficit and should the estimates prove correct there should be balance of just under \$ 1,000,000 to meet any unforeseen expenditure.

"The necessity for charging the Shing Mun Water Scheme to loan was foreshadowed by the late Governor in his Budget speeches in 1924 and 1925. So long as there were surplus balances available Sir R. E. Stubbs rightly refrained from proposing additional taxation or the raising of a loan; the position has, however, now been reached when the balance is exhausted and the Government proposes to act on lines suggested by Sir E. R. Stubbs at the close of his speech when introducing the last Budget."

At present all of the water used on the island containing about 500,000—600,000 inhabitants—is supplied by reservoirs retaining water collected from catchment areas on the island.

We will now consider in detail the problem of the water supply of Kowloon and the shipping. All of the half a million gallons a day required for the ships is taken from reservoirs on the Kowloon area of the Colony.

Present Supply

The existing arrangements for the Kowloon water supply involve no pumping machinery. A range of hills at the back of Kowloon and in the New Territory contains valleys high enough for the construction of reservoirs four or five hundred feet above sea-level.

For some years, since 1910 Kowloon has been supplied with water collected in a reservoir situated at a top water level of 448 feet above sea level. That reservoir has a storage capacity of 352.5 million gallons. It is supplied by catchment areas totalling about 1,218 acres.

Recently a new reservoir, known as the Shek Lai Pui reservoir, with a storage capacity of 100 million gallons was opened. The top water level of this reservoir is 645 feet above sea level.

There is the problem of increasing the water supply from catchment areas to these reservoirs as well as building, at some future date, new reservoirs.

The complete Shing Mun Valley Scheme consists of five separate sections. It includes the entire development of the whole of the "Shing Mun" Valley, stretching from Lead Mine Pass to the sea at Shatin. The drainage of the Northern and Southern slopes of Tai Mo Shan will be diverted into the Shing Mun Valley, providing a drainage area of 13 square miles. Tai Mo Shan rises to 3,100 feet above sea level. We may remind the reader that the original scheme included a pipe line across the Harbor. There is no intention of carrying out that work in the immediate future.

The following statement gives a general idea of the whole scheme, which has been divided into five sections and which can be carried out as time and circumstances permit. The first three sections require no outlay on pumping machinery. The reservoirs are sufficiently high to allow the water to fall by gravity. The complete scheme may be outlined as follows:—

THE 1ST SECTION comprises the construction of the necessary aqueducts, tunnels, and the reception reservoir for raw water to cope with the yield of the fully developed scheme. Filtration plant, service reservoirs, and a pipe line to deal with 5 million gallons daily are provided for in the meantime, but admit of extension when necessity arises.

This section deals with the normal flow of the Shing Mun River, which has been diverted above Pineapple Pass into the permanent conduits and tunnels by means of a temporary channel. An access road, 1.29 miles in length, from Tsun Wan to Pineapple Pass is also included in this section.

THE 2ND SECTION deals with the construction of three impounding reservoirs in the upper Shing Mun Valley, having an estimated total capacity of 2,000 million gallons, catchwaters discharging through Lead Mine Pass, and the necessary extension to the filter plant, while a second trunk main would also probably be required under this section.

THE 3RD SECTION involves the construction of a large catchwater drainage 2,575 acres of the Southern face of Tai Mo Shan from Tsun Lung Village to Pineapple Pass where it will discharge into the Shing Mun Valley. Two storage reservoirs near Tsun Lung, having an aggregate capacity of about 340 million gallons, would also be constructed to control the flood water discharge in the catchwater, while further additions to the filtering plant and to the trunk mains would also have to be made.

These three sections complete the gravity portion of the Scheme and are estimated to provide a minimum daily yield of 11 million gallons.

THE 4TH SECTION consists of an Access Road from the Tai Wai Village to the mouth of the North Tunnel, two storage reservoirs having an aggregate capacity of 2,100 million gallons, catchwaters draining the Eastern slopes of Needle and Grassy Hills, and a pumping station at Tai Wai with rising mains to the mouth of the North Tunnel.

THE 5TH SECTION is a very doubtful one and may never materialise. It projects the development of the Gin Drinkers Bay Valley by forming a large dam across the estuary with the necessary pumps and mains to deliver the water into the South Tunnel. An estimated yield of 5 million gallons daily may be expected from this source, but this quantity is additional to the 17 million gallons already alluded to.

The approval of the Scheme by the Secretary of State for the Colonies was received in May 1924 with sanction for the immediate construction of the first Section.

The works involved are:—

1. An access road 16 ft. in width and 1.92 miles in length, from Tsun Wan to Pineapple Pass.
2. An intake dam across the Shing Mun River above Pineapple Pass with a temporary conduit 6,000 ft. in length.
3. The North Conduit 2,900 ft. in length.
4. The North Tunnel through Smugglers Ridge 2,160 ft. in length.
5. The South Conduit 2,000 ft. in length.
6. The South Tunnel through the Golden Hill 4,680 ft. in length.

7. A raw water reception reservoir in the lower Shek Lai Pui Valley having a top water level of 480.00 A. O. D. and an effective capacity of 33 million gallons.
 8. A filtration plant immediately below the above reservoir, of which the first Section will be capable of dealing with 5 million gallons per day.
 9. A covered reinforced concrete service reservoir of 5 million gallons capacity adjoining the filters.
 10. A 24" trunk main to Kowloon Point 4.40 miles in length with a feed to the Kowloon System at Piper's Hill.
 11. A covered reinforce concrete service reservoir at Piper's Hill with a capacity of 1½ million gallons.
- The whole of these eleven items have been completed. The Secretary of State also approved of three more items (12, 13 and 14) which have not been put in hand but which are of interest to Engineers. They are:
12. A 24" main 1.10 miles in length across the Harbor from Nathan Road, Kowloon, to the Praya at Jackson Road, Hongkong.
 13. A 24" main 0.60 mile in length from the Praya at Jackson Road to the Botanical Gardens.
 14. A covered reinforced concrete service reservoir in the Botanical Gardens disposing of a 5 million gallons capacity at a top water level of approximately 280 A. O. D.
- It is now proposed to describe in detail the work that has been carried out by Messrs. Sir W. G. Armstrong, Whitworth Ltd. That will enable the reader to realise the magnitude of the task which that firm undertook.

The representative of this firm in Hongkong was Mr. P. R. Wareen, M.I.C.E., M.A.M.SOC.C.E., and M.ENG.INST. of Canada, O.B.E. He has personally superintended all of the work which has been completed to the satisfaction of all concerned.

The contract consisted of the construction of two tunnels and an open Conduit joining them, together with a Gauge Basin at the Southern end. The length of the North and South Tunnels are 2,160 and 4,680 feet respectively, and the South Conduit with tunnel approaches 2,000 feet.

The specified time for the completion of the works was approximately 18 months, but owing to considerable sickness amongst the European Staff and the Chinese Labor, a general strike that affected the whole of the Colony for several months, and the fact that difficult and water-bearing ground was encountered in the North Tunnel for several hundred feet, the completion of the works was delayed about four months. The excavation for the South Tunnel Approaches and also for the South Conduit was commenced in January, 1925, and tunnelling was commenced as follows:—

North Tunnel ...	South end ...	April 1925.
South ,, ...	North ,, ...	February, 1925
South ,, ...	South ,, ...	April, 1925.

- (a). The boring of the South Tunnel, which is the longest, was started from both ends, but the North Tunnel was only attached from the South end, as the North Face was very inaccessible, the side of the hill being almost sheer in this locality, and the length of the tunnel being less than half of that of the South Tunnel.

The ground through which this tunnel was being driven was however found to be soft and water-bearing, which necessitated a considerable amount of heavy timbering and subsequent lining with concrete, this delayed the progress to such an extent that it was decided in November, 1925, to open up the North Face and drive from both ends.

Owing, however, to certain modifications by the Engineers of the Plan for the Approach at this end, the heading was not commenced until June, 1926.

The South Tunnel Headings were joined up early in July 1926, whilst those for the North Tunnel were joined in the middle of August, 1926.

The error in the alignment in both tunnels was practically nil, being under 2 inches in each case, this was a very satisfactory result considering the rough and inaccessible country over which the surveys had to be made.

The drilling machines used were of the Leyner Drifter Type, with 1½" round hollow steel drills, driven by Compressed Air.

The pressure at the Power House was kept at 100 lbs. per sq. inch, in which resulted in a pressure of about 90 lbs. at the drill. The air main was 3" dia. the maximum length being over 3,000 feet.

A jet of water was maintained through the drills at a pressure of about 30 lbs., which eliminated dust, kept the holes clean and the drills cool.

Two drilling machines were worked in each face, mounted on a horizontal bar.

The length of the holes drilled varied from 3 feet to 5 feet, and the number in each round from 28 to 38 according to the class of rock encountered.

The holes for the cut were drilled round a central area about point 4' 6" across with each pair of holes aiming to meet at a common point of 3' 6" to 5" from the face.

The cut holes were loaded and fired first and then the remainder of the holes.

Blasting gelatine with electric detonators were used for the cut and gelignite for the remainder, which were fired electrically in some cases, and by time fuse in others.

The average amount of explosives used throughout the work was 9 lbs. per 1 in. ft. of tunnel.

The material encountered throughout the full length of the South Tunnel was hard granite, but in the North Tunnel this was intermixed with decomposed granite and dykes of shale, which latter was very treacherous when exposed to the Air. The Power for driving the tunnels was provided by three single acting compressors with a capacity of 450 cubic feet of free air per minute, delivering at a pressure of 100 lbs. per sq. inch. These were provided with after-coolers and receivers and belt-driven by three 115 H. P. Semi-deisel Engines.

A Portable Air Compressor was installed at the North Face of the North Tunnel, which was capable of running one Leyner Drilling Machine at 80 lbs. pressure.

Two Leyner Drill Sharpening Machines with Oil Furnaces were employed for sharpening the drills, as many as 600 drills were being dealt with by each machine in 24 hours.

Two electric generating sets with a total capacity of 16 K. W. and driven by Oil Engines were used for lighting and ventilating the tunnels. The whole of this electrical plant was duplicated to provide against stoppage of work by breakdown in the lighting and ventilating system.

The Cableways, 3,000 feet long each, were employed for transporting machinery, materials and stores from the main roads to the Works. These had a capacity of 5 tons, per hour with a maximum individual load of 5 cwts. per carrier.

Worthington Pumps, driven by compressed air, were employed for dealing with the water in the tunnels.

The excavation from the tunnels was handled by mine skips of one cubic yard capacity running on a track with a gauge of 2 feet. Jackhammers were employed for poling back in the tunnels where the concrete lining was required, and also where the original headings had not been excavated to the finished section. The average progress in all headings was 36 feet per week, the best weekly output being 55 feet in one week, working 3 eight-hour shifts each 24 hours.

With the exception of one European Tunnel Foreman on a day and night shift in each heading, the whole of the drilling and blasting was carried out by Chinese Labor, who in the initial stages had to be taught to handle the machines, etc., and it would not have been reasonable, therefore, to have expected results that could have been obtained by skilled miners.

It is scarcely necessary to add that sincere congratulations are due to Mr. P. H. Warren for the successful completion of the contract.

The plant used is being removed and at the time of writing is offered for sale.

It is hoped incidentally that the object lesson of the methods employed have not been lost on local Chinese contractors; they now seem less disinclined to use mechanical appliances.

The work in connection with the Reception Reservoir was carried out by Messrs. Trollope and Colls. Certain new catchment areas have been drained and the contracts for that work were carried out by the Hongkong Engineering and Construction Co. Ltd.

The contracts let to Messrs. Ng. Wah (the intake, temporary conduit, north conduit and Piper's Hill Service reservoir have also been completed.

The access road built by Chun Sing and the reception reservoir built by Messrs. Trollope and Colls are in use.

This completes the account of the Shing Mun Valley work. Enough has been written to enable anyone with an engineering training to appreciate the magnitude of the scheme and the unusual technical details involved.

The Other Schemes

We may, with advantage, consider what had been done in connection with the Hongkong Water Supply before the Sing Mun Valley Scheme was suggested.

In order to understand the growth of the problem it must be remembered that it is only since about 1910 that there has been any demand for water in Kowloon. For years, the island of Hongkong contained the only residential or business houses.

As already mentioned from 1841 to 1860 the inhabitants of the city of Victoria took their water from small tanks on the hills or from which ran pipes direct to the houses.

In 1863, there was completed the first effort to provide a public supply of water. There was, at the time, a suggestion that private enterprise should supply this need but the inhabitants of the island appear to have been reluctant to supply the capital sum needed. The local Government therefore undertook to provide this essential public service. No one can doubt that it has been greatly to the benefit of the community that there never has been any question of vested interests being concerned with the water supply of Hongkong.

The first public service was obtained from the Pokfulam works which are situated to the West of the island. The original scheme provided for a small intake reservoir holding 2,000,000 gallons, a ten inch cast iron main from Pokfulam to Roberson Road, a tank to hold 200,000 gallons at the end of the main, also there was another tank at the top of Taipingshan to hold 850,000 gallons. This installation included 30 fountains and 125 fire-cocks. We may be sure that the problem of fire prevention influenced the local authorities to undertake a public supply of water. The total cost of this first effort was \$ 170,000.

As has so frequently happened in Hongkong, the demand for water exceeded soon all expectations. No sooner was the above scheme completed than the much larger Pokfulam reservoir holding 66,000,000 gallons was planned and (1866-71) was built. That cost \$ 223,000.

The next step was to replace the 10 inch cast iron main from Pokfulam to a tank above the center of the city by a conduit three miles long.

Soon after that it became evident that the whole problem of the water supply for Hongkong must be reviewed. Sir Robert Rawlinson reported in favor of the Tytam scheme at the East end of the island.

That scheme involved a concrete and masonry dam at Tytam to impound 312,000,000 gallons. A tunnel 2,429 yards long was bored through the hills which separated the reservoir from the city. A covered masonry and brickwork conduit 5,163 yards long was constructed so as to bring the water to the distributing center situated above the city. A service reservoir of 5,700,000 was also built.

These works were carried out from 1883-9 and cost \$ 1,257,000. In 1890, filter beds and a service reservoir of 941,000 gallons capacity were constructed at a cost of \$ 37,000.

At that time, the total storage capacity for the island was 378,000,000 gallons and it was evident that the existing distribution system was inadequate.

Three motor pumping stations were therefore erected and 20 miles of mains, varying from 14 inches to 3 inches diameter were laid and service reservoirs built (1890-92). That cost \$ 160,000.

In 1891, the supply to the Peak was instituted. That cost \$ 32,600 for mains, pumping station and tanks.

The Pokfulam reservoir was increased in capacity from 66,000,000 gallons to 70,400,000 gallons in 1895. That was done by the addition of overflow boards to the overflow of the dam.

In 1897, the dam of the Tytam reservoir was increased in height by 10 feet. That gave Tytam a capacity of 407,000,000 gallons instead of 312,000,000.

The total storage capacity at 1897 was therefore 477,400,000 gallons.

In 1899 Wong-nei-Chong reservoir was built. That gave another 33,260,000 gallons storage.

Just at about that time, Hongkong suffered greatly from not infrequent periods of water famine. H. E. Sir Cecil Clementi, K.C.M.G., L.L.D., the present Governor of Hongkong recently related at a Legislative Council meeting his own experiences of more than twenty years ago when in the great famine, the reservoirs became so empty that water from the mainland had to be carried to the island.

In 1904, the Tytam Bywash Reservoir was added giving an additional storage capacity of 26,301,000 gallons.

This brought the total storage capacity (on the island only, there being no demand on the mainland) to a total of 536,961,000 gallons.

By 1907, the total storage capacity had been increased to 747,261,000 gallons by the completion of the first section of the Tytam Tuk Scheme.

In 1912, there commenced the great work at Tytam Tuk which resulted in practically trebling the storage capacity of the island.

When that work was completed the storage capacity of the new reservoir was officially given as 1,420,000 million gallons. The total capacity of all of the others was 747,000,000 gallons.

A Great Engineer

The names of two local P. W. D. Engineers Messrs. Henderson and Purves, are associated with the Shing Mun Valley scheme. The name of the late Mr. D. Jaffé, of the local P. W. D. is connected with the great Tytam Tuk reservoir.

It is difficult for one who visited the works with Mr. Jaffé on several occasions to write with restraint about this man who died in early life as a result of his devotion to his work. He designed and carried out every detail of the Masonry dam which is perhaps his monument and typical of the stability and reliability of his character. Jaffé was the type man that has made the tropics habitable. Such men have fine ideals; they build well without sparing themselves. He gave of his knowledge, his energy and his time freely because he believed that he was doing something that would benefit Hongkong for all time. It was a task that finally cost him his life. A comparatively young man of great ability and amazing industry, he was one of that gallant band of pioneers who have sacrificed themselves at the call of duty. There is a stone at one end of the motor road that runs across the top of the big dam at Tytam Tuk. The name of Jaffé appears on that stone which gives the date when the reservoir was completed. The name on that stone always reminds the writer of Kipling's lines:—

"Never the lotus closes

"Never the wild fowl wake

"But a life goes out on the East Wind

"That has died for England's sake."

The bridge-builders, the pioneers of the railways, the men who irrigate the desert, the engineers who, in the unhealthy places of the earth, cut a canal as at Panama or tunnel through a Mountain as at St. Gothard—they often pay for their daring challenge against the cruel forces of Nature. Jaffé contracted a bad type of malaria while he lived near the dam that he designed and built. It proved fatal. His only ambition was that the work should be well done and that was his great achievement. Like any soldier falling at the moment of victory, Jaffé lived just long enough to see the dam completed—he never saw the great reservoir completely filled. Physically broken when the task was done, unrecognised locally as the genius he certainly was, his quiet acceptance of the news that his end was near enabled his colleagues to realise that the man was worthy of the great monument in granite that impounds the millions of gallons of water at Tytam Tuk.

The following details of his work will enable the reader to appreciate his services to Hongkong.

The most important feature of the Tytam Tuk Scheme is the big dam, 1,200 feet in length. It is formed of two straight lengths on plan, joined by a short curved length. A roadway of 16½ feet clear width along the top of the dam forms part of the road around the island. The maximum height of the dam from the lowest part of the foundations to the road-level is 171 feet, and its maximum width at the base 115 feet. It is a most solid

structure of concrete with massive granite facings, some of the latter being bound together with steel bonding ties. From the giddy height of the roadway and from the bast of the dam the impression of the onlooker is that the structure will exist for centuries to come. The dam from the foundations to the top water level is constructed entirely of cement concrete the whole of which, with the exception of a layer adjoining the water face, has large granite stones embedded in it, while the layer in question is all of fine cement concrete.

An unique feature of the dam is that for a length of 238 feet the foundations had to be excavated below the level of the sea. The maximum depth below to which it was necessary to excavate is forty feet. In order to enable this part of the work to be carried out two coffer-dams were erected across the bed of the stream which flows into Tytam Bay, one above and the other below the site of the trench for the dam. The upper coffer-dam diverted the stream into a cut leading to two 12 feet diameter culverts through the base of a section of the foundations of the dam previously completed. The lower coffer-dam kept the sea from flooding the trench. These temporary arrangements proved quite satisfactory. The foundations of the big dam between the coffer-dams were carried down to sound rock, and subsequent building operations were conducted in the dry. All the percolating water was dealt with by means of temporary steam pumping plant of moderate capacity, a 10-inch ram-pump generally being sufficient. The two culverts mentioned as used for the diversion of the Tytam stream are now connected up with the draw-off tower of the dam and have been made to serve for the accommodation of mains to the stand pipes in the tower. It would be quite possible to go into much greater detail regarding this important work, to describe the culverts through the dam, the machinery controlling the outflow of water the grades of concrete and method of mixing same, the ashlar facing and manner of bending special stones together, etc, but space is limited and sufficient has been written to show the reader the magnitude of the scheme. The cost of the dam, pumping plant, mains, etc, was about 2½ million dollars. At times during the five years in which the work was under construction there were as many as 2,000 workers skilled and unskilled, the lowest establishment being 500.

It is hoped that the details of the new and old schemes for supplying water to Hongkong island and Kowloon will remind the reader of some of the advantages of scientific knowledge applied with the desire to make life less difficult and less dangerous for those who dwell in the Far East. It is believed that the example of a good water supply in Hongkong and a practical demonstration of the many advantages that result from such arrangements will not be lost on those who may be in a position to initiate similar schemes in the interior of China. For a good water supply reduced the mortality of any town.

Some Interesting Figures

The following figures obtained from the annual report of the Director of Public Works for 1925 are of interest as they show what is the demand for water in Hongkong.

On the city and hill districts the total quantity of water stored in the impounding reservoirs on January, was 1,561 million gallons. The minimum water storage was recorded on June 14 and it was 825 million gallons.

During the year, a total quantity of 3,017; 24 million gallons of filtered and 39,65 gallons of unfiltered water was supplied.

During 1925, the average consumption of filtered water per head per day for all purposes throughout the year was 21 gallons.

The rainfall for the year was 87.58 inches which is 2.39 inches above the average for the last 42 years.

The dry season in Hongkong varies in length but it has continued from early in October until May. It is obviously the length of the dry season that causes anxiety. It is not uncommon, during the rainy season, for the reservoirs to be overflowing.

There are many other engineering schemes in Hongkong of great interest carried out under the general supervision of the Director of Public Works and his staff. The reclamation schemes, the roads, the drainage, etc, all demand constant supervision by men of considerable experience and technical ability. It may be permissible to express the opinion that the water supply is perhaps the most important from the point of view of the community.

M.S.

Building Bridges Under Traffic on the Kiao-tsi Line

Replacing Old Bridges with Concrete Slabs in 89 Minutes

By F. K. Sah,* *Engineer-in-Chief, Kiaocho-Tsinan Railway*

THE Kiaocho-Tsinan Railway has approximately 800 small bridges of 1 m. to 10 m. spans which are being replaced by concrete slabs. The principal reason for this replacement is due to the change of loading. The loading for the original bridges was only equivalent to about Cooper E-25, whereas locomotives of E-35 have been running on this line even before the railway was taken back by China in 1923. It was imperative that the bridges of the Kiaocho-Tsinan Railway be changed as speedily as possible to heavier loading for the safety of traffic and to meet the changing conditions.

*Oriental Engineer.

The New Bridges

Accordingly all new bridges that are being erected are designed with a loading of Cooper E-50. Of the above mentioned 800 short spans about 50 per cent are of two meter span or less.

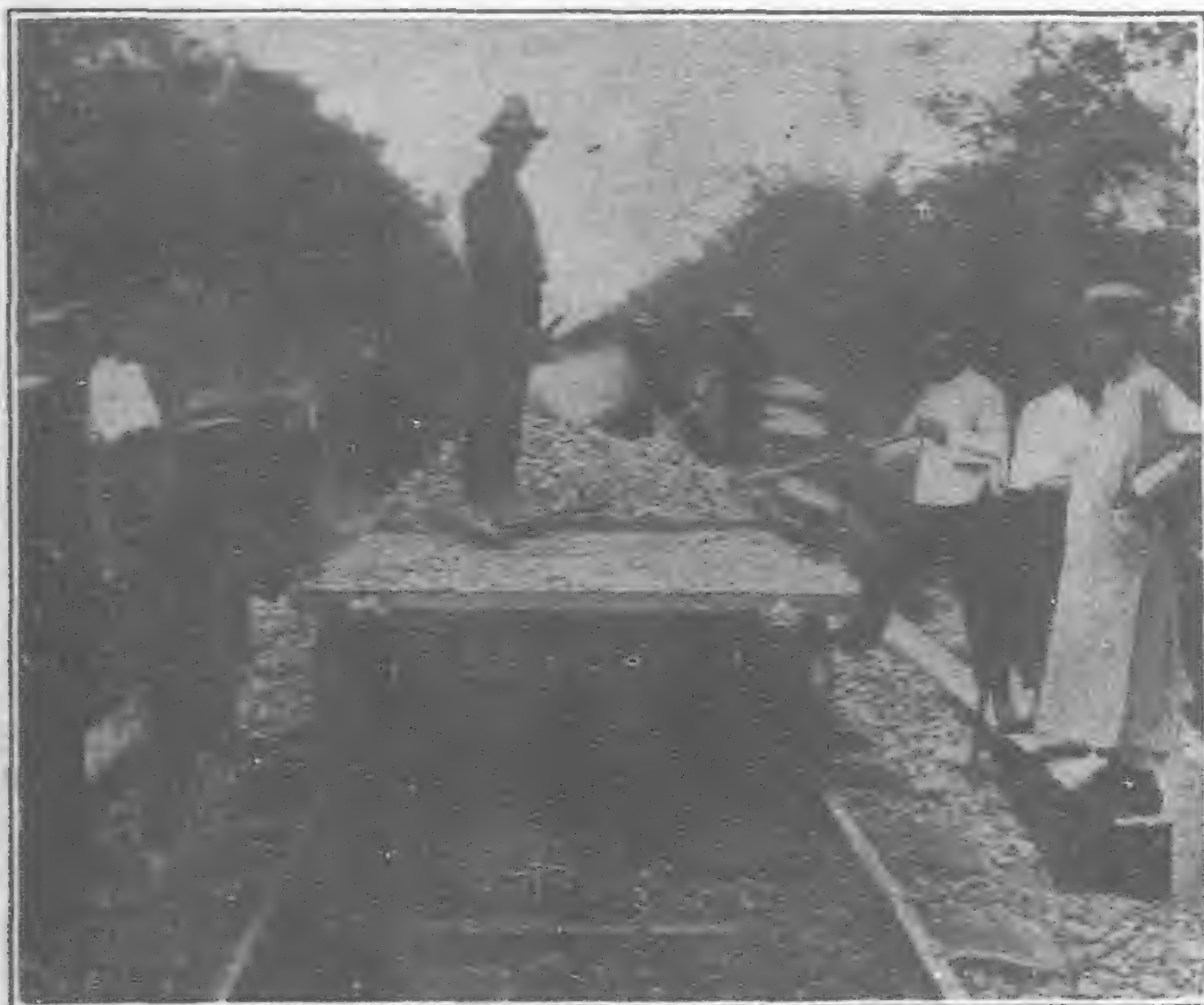
The concrete slabs are of four different types of reinforcement, viz. I-beams, channels from old bridges, old rails, and steel rods. The I-beams, channels, or rails in each case are figured to carry the whole load while the concrete is only for protection. Those slabs which can be handled by a crane are cast in the Engineering Department Concrete Casting Yard at Szefang, then shipped to site



1.00 p.m. Ready to Remove the Track and Old Bridge



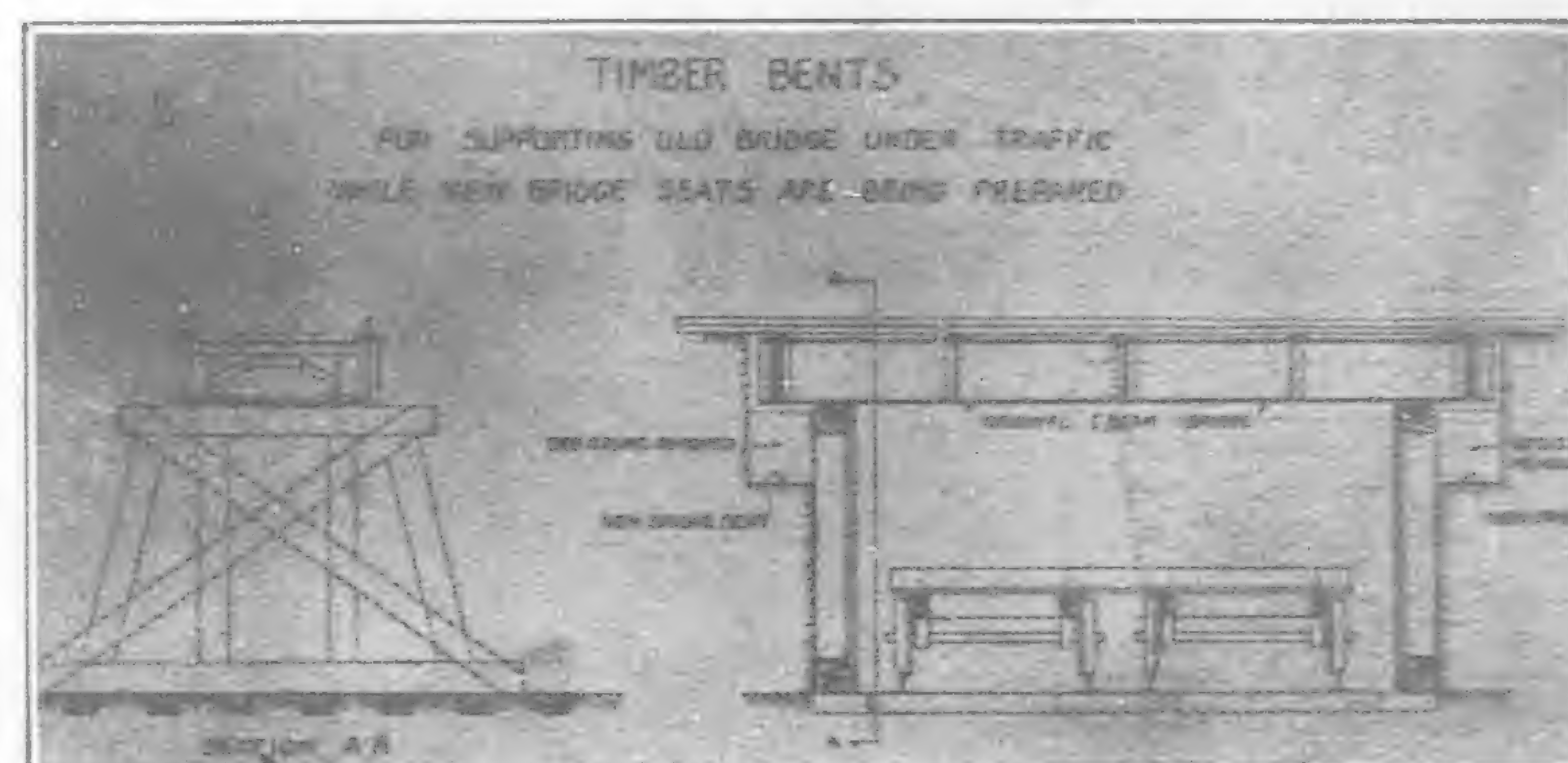
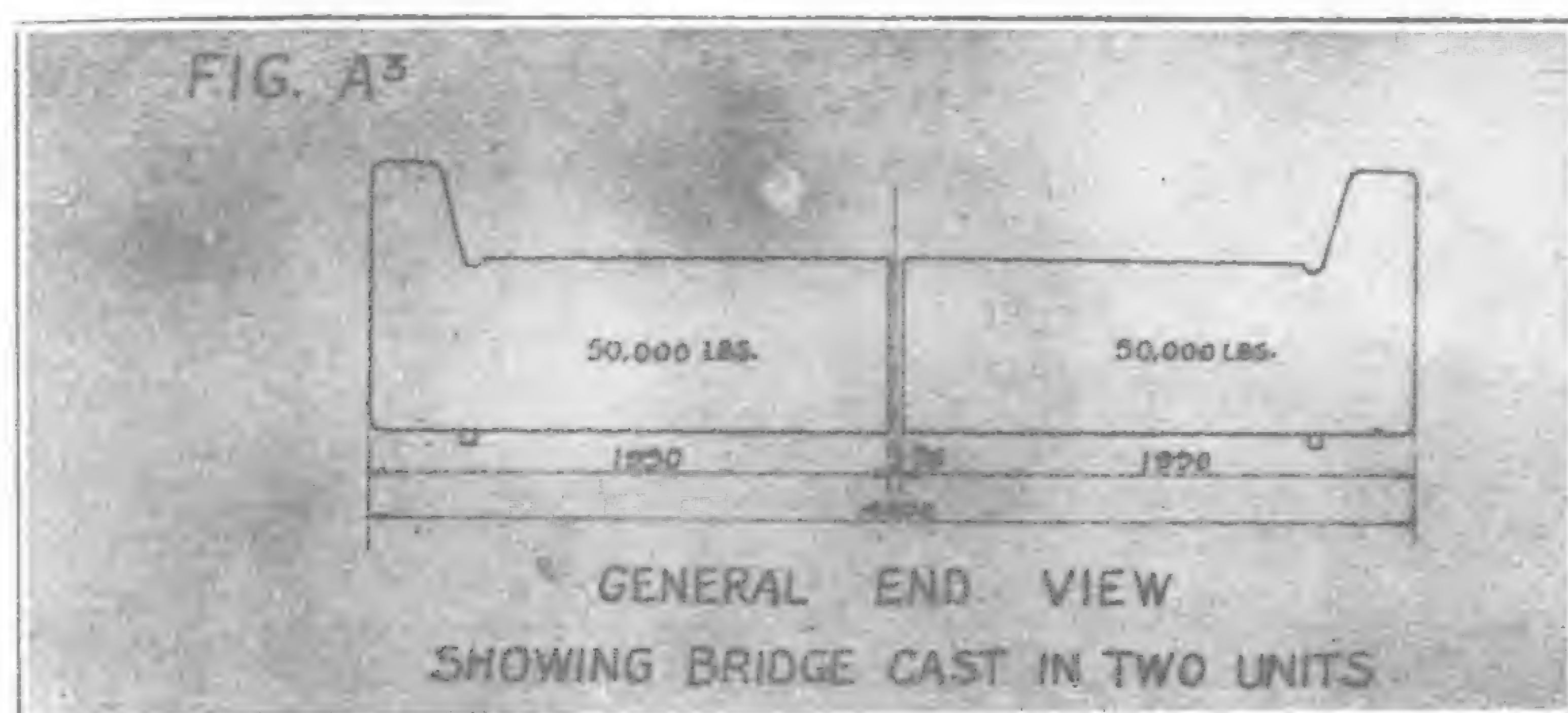
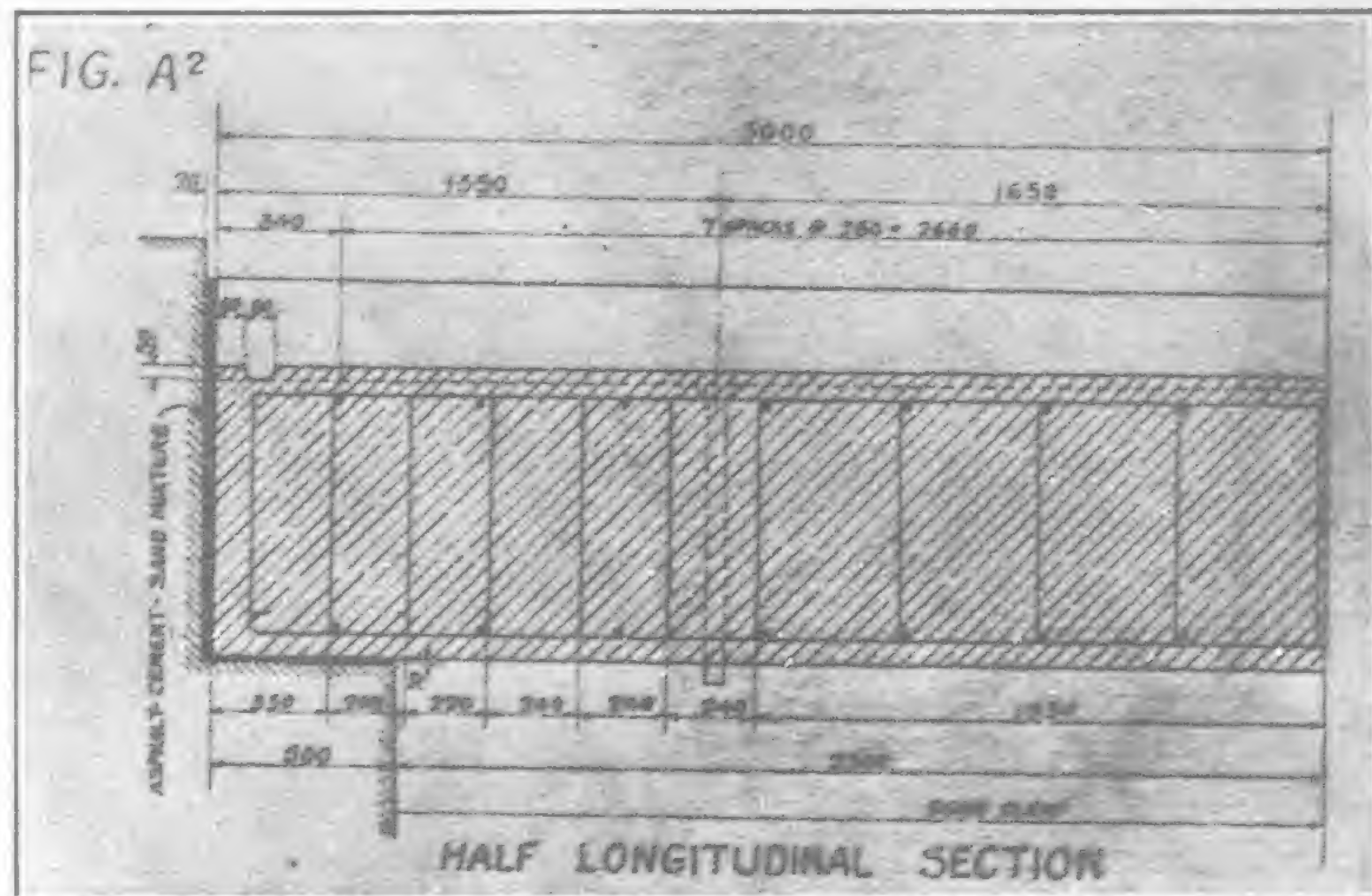
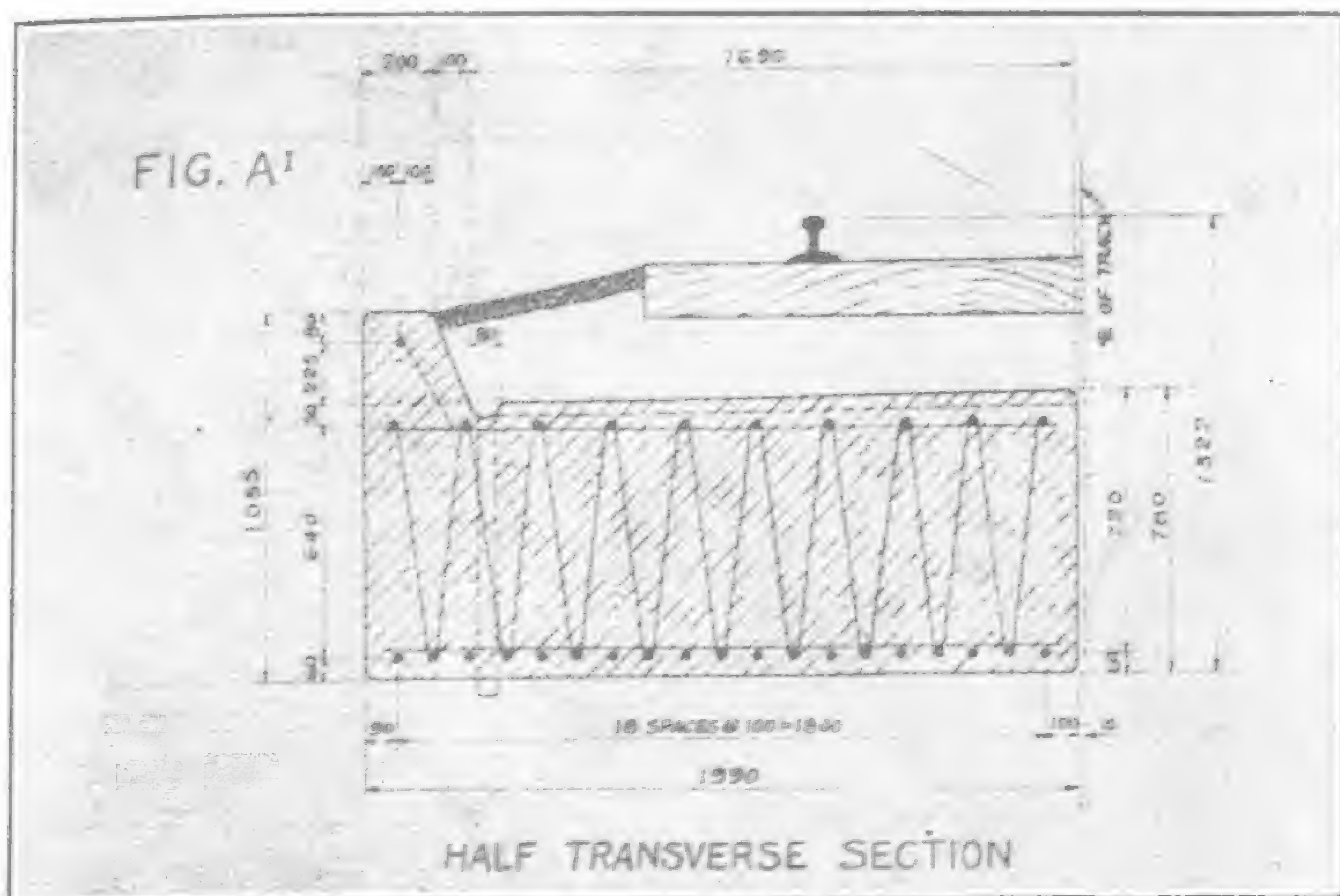
1.12 p.m. Old Bridge Shifted



2 p.m. Ballasting



2.29 p.m. All Ready for Train to Pass Over



and erected by locomotive crane. Spans weighing under 15 tons are cast whole, while those over 15 tons are cast in two units, being divided along the center line of track. In case one unit weighs over 20 tons the slabs are cast along side of the bridge site as was the case described in the following. Our locomotive crane has a maximum capacity of 30 tons at five feet radius, so that in this case where one unit weighed nearly 25 tons, the locomotive crane could not be used with safety and the method of erection was adopted which is shown in successive steps by Figs. B, C and D.

Erected Under Traffic

On June 9th 1926, a standard 5-meter concrete slab bridge was successfully erected under traffic at Km. 22 plus 253. On account of difficulty in getting I-beams of the required length at the time, the steel rod reinforcement type was selected for this particular bridge as shown in Fig. A. As a rule it is more preferable to use the I-beam, channel or old rail type because the steel rod reinforced concrete slab requires greater skill in casting. It is to be noted that one unit of this bridge weighed 50,000 lbs. The two units were cast on forms resting on piers of built up sleepers as shown by Fig. C, the bottom of the concrete forms being of slightly higher elevation than the bridge seats. The age of the concrete slabs was six weeks at the time of erection.

Process of Erection

As there was a difference of about one-half meter in elevation between the old and new bridge seats, timber bents were used to support the old bridge temporarily while the new bridge seats were being prepared. These timber bents,

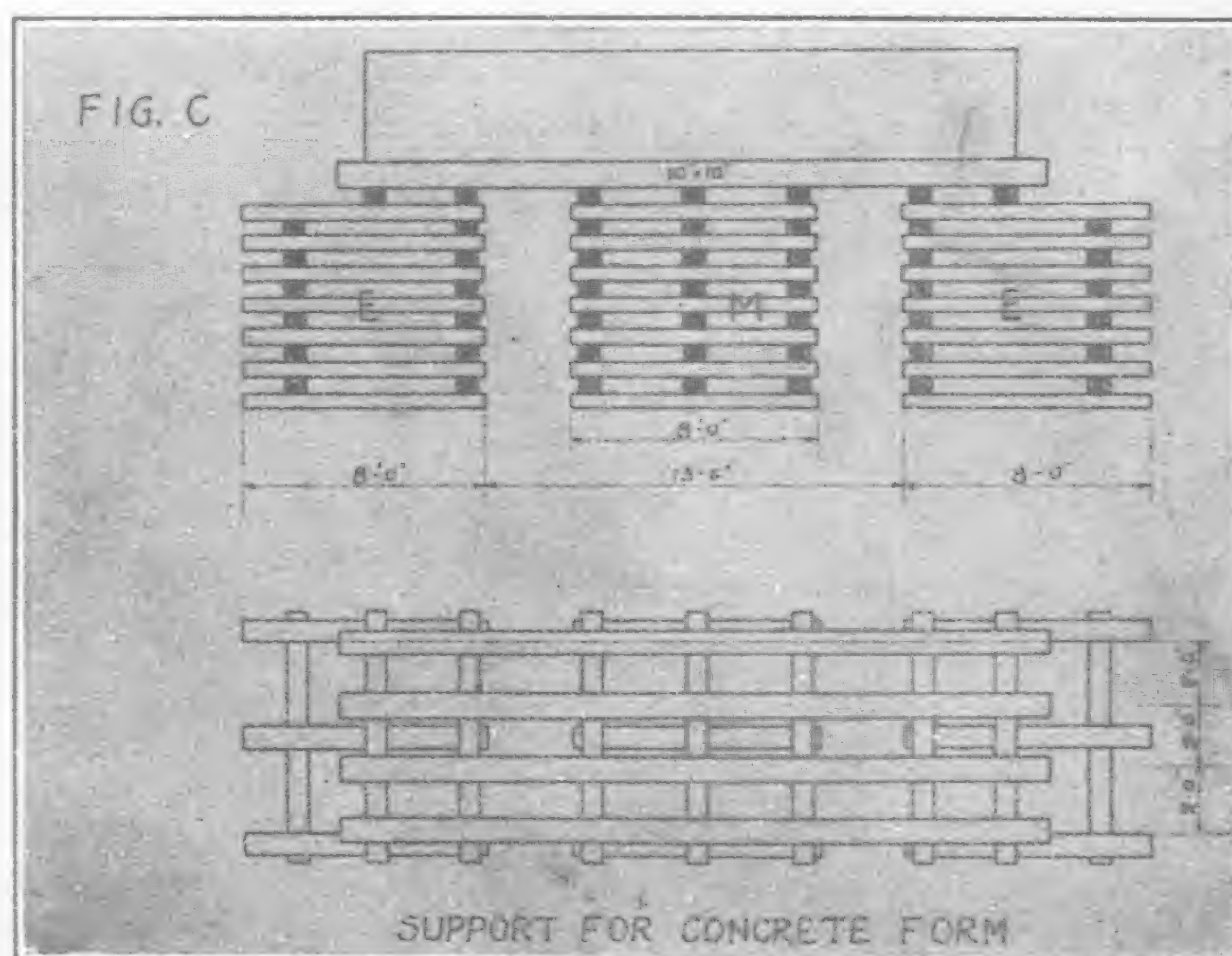
(see Fig. B) carried the entire bridge while traffic was going on and while the old bridge seats were dug out and new bridge seats concreted in.

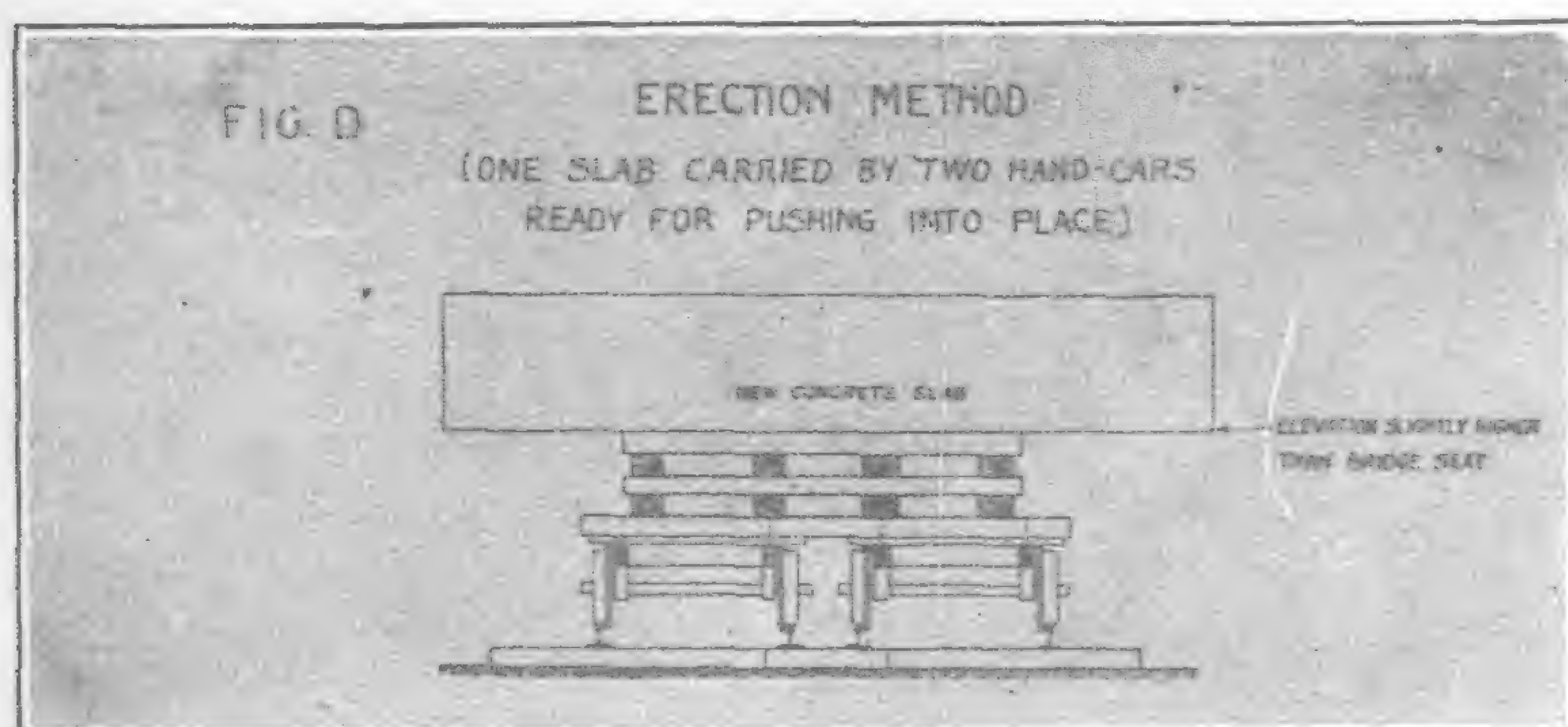
The next step in the erection was to transfer the slabs to the hand-cars which run on tracks in the bridge channel. From the position shown by Fig. C the slab is first raised by jacks to allow the removal of the 10" x 10" beams and the top layer of sleepers of the middle pier M, then the slab is lowered until it is supported by the two end piers E. The middle pier M can now be removed to make room for the laying of the two tracks for the hand-cars which are pushed in under the slabs. Each pair of hand-cars is bolted together to receive one unit. Sleepers are built up on the hand-cars as shown by Fig. D to the required level for carrying the slabs. When the slabs are properly carried by the hand-cars the end piers E are removed, leaving the slabs carried entirely by the hand-cars as shown by Fig. D. Care should be taken to lay the tracks for the handcars perpendicular to the center line of the main track, and when transferring the slabs from the piers to the hand-cars great

caution should be taken to assure the slabs being in a position parallel to the center line of the main track. By so doing, it will facilitate the work when placing the slabs on to the bridge seats.

Asphalt Cement

On account of the great difficulty of getting a perfect contact between the bridge seats and the concrete slab, a layer of asphalt mixed with cement and sand is put over the bridge seats before the slab is erected in place. This mixture of asphalt-cement-sand acts as a filler for all voids that might exist between the bridge seat surface and the bottom of the slab. After the slabs are put on, this asphalt





mixture is filled in vertically from the top at the end of the bridge and also rammed in horizontally to fill up remaining voids. The proportion of the asphalt mixture was ; 138-lbs. asphalt, one cubic foot of cement, and 4.5 cubic feet of sand. The asphalt mixture is applied when in the plastic or semi-liquid state, but will consolidate very quickly.

In 89 Minutes

The time required for the erection work was as follows :—

Removal of old bridge and track	...	...	12 minutes.
Pushing new slabs into place and levelling up	...	20	"
Packing ballast and putting on track	...	57	"
Total time	...	89 minutes.	

The greatest amount of time consumed was in the dumping and packing of the ballast. It was important that the ballast should be well packed as a train would pass over the bridge immediately the erection was completed. The passage of the first train over the new bridge produced no appreciable sign of settlement of the track.

Cost of Bridge

The work of casting the slabs and erecting same was entirely carried out by railway coolies. Altogether about 25 coolies were used for the erection work, among them a few carpenters and masons. There were about ten track coolies. The cost for this bridge was as follows :—

	Material	Labor	Total
Making forms	\$47.52	\$43.47	\$90.99
Casting slabs	586.39	138.95	725.34
Remodeling abutments, etc	108.43	98.36	206.79
Total	\$742.34	\$280.78	\$1,023.12

The cost for the timber for forms and bents are distributed over several bridges as practically all the timber can be carried forward to other bridges for similar use.

Previous to the removing of the old bridge numerous baskets full of ballast were prepared, also several flat cars with removable sides were filled with ballast. As soon as the slabs are in place the ballast in the baskets is first dumped on the new bridge, and then the track is laid over which the flat cars of ballast are pushed on and unloaded. This saves considerable time in the ballasting

work. Up to the present writing 35 slab bridges have been successfully erected under traffic, and as this work goes on, the men gain more experience which is bound to result in better and quicker work.

Reinforced Concrete Superior

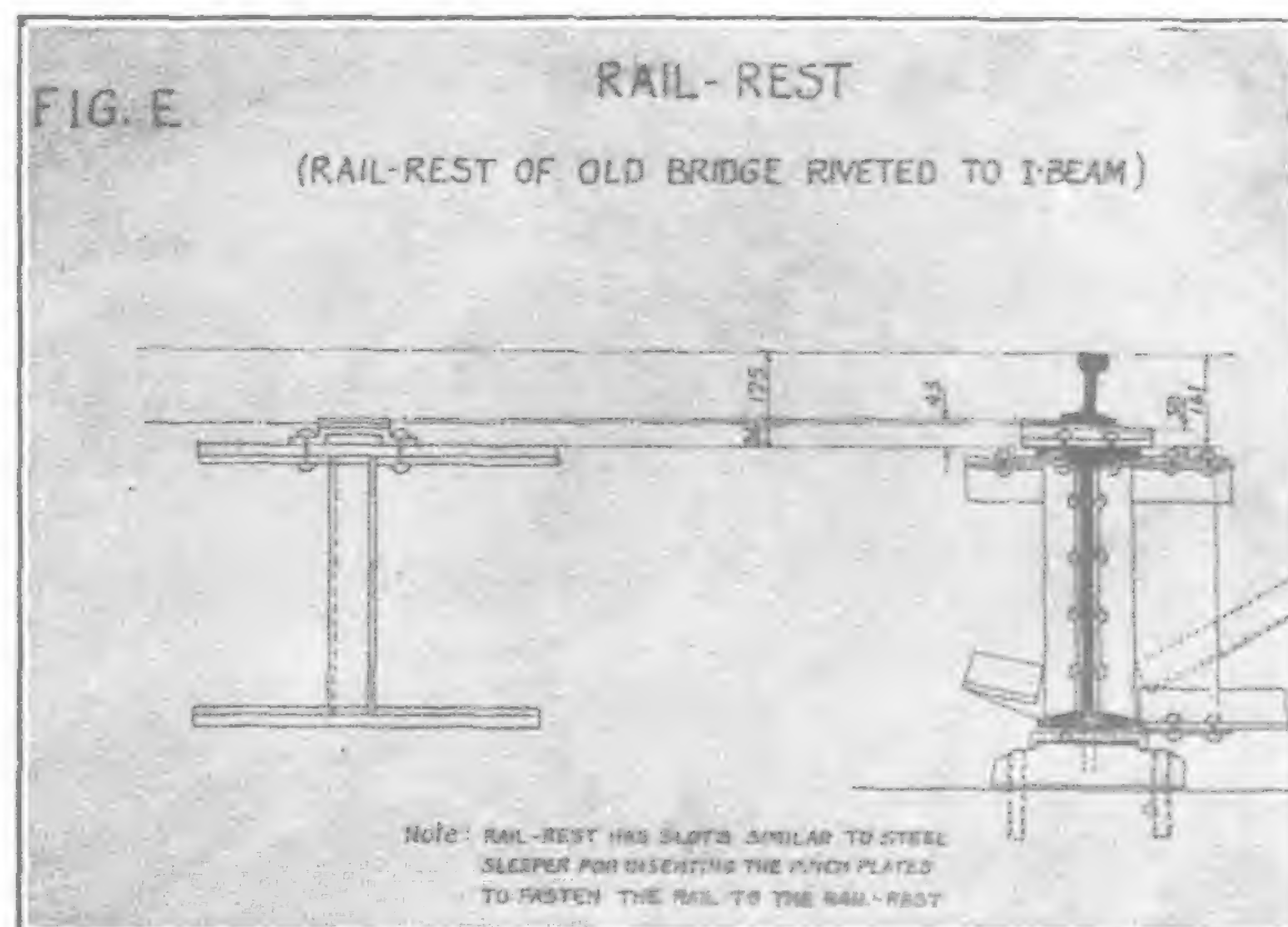
The reinforced concrete slab bridges are certainly much superior to the former I-beam bridges, for the slab bridge gives a much smoother track. Besides its maintenance is practically nil and possesses a longer life. The I-beam bridges on the Kiaochow-Tsinan Railway have no sleepers. The rail is placed on rail-rests which are riveted on the top flange of the I-beam as shown in Fig. E. Naturally this gives a very noisy track, and the impact and vibration caused by the passing trains hastens the loosening of the rivets. This results in a heavy expense in the renewal of these rivets. But when the train passes over one of these slab bridges no noticeable difference is felt by passengers on the train from that when riding over a track built on solid ground as the running is very smooth.

Use of Old I-beams

The I-beams of the old bridges taken out may be used as reinforcement for new slab bridges of shorter span, or it may be doubled up for another bridge, or scrapped if the condition is bad. In case the old I-beams are used for slab bridges, three spans of I-beams are required for one span of slab bridge, but when used in doubling up, two spans become one span material.

Besides the slab bridges described above, many concrete arches are put in to replace the present light bridges. This work is also carried on under traffic. Wherever there is good foundation and enough height for the springing line, the arch is used, the maximum span of the concrete arches being about 20 meter. In a later article a description of the erection of the concrete arch bridge under traffic will be given.

The reinforced concrete slab bridge shown in Fig. A was designed by our Bridge Engineer Mr. C. Y. Wang. The concrete casting and field erection work was carried out under the supervision of District Engineer Mr. E. K. Denn.



New Adriatic-Far Eastern Motorship

THERE has recently been launched from the Cantiere San Marco of the Stabilimento Tecnico Triestino, the motorship *Remo*, which has been built to the order of the Lloyd Triestino at Trieste. Present at the launch were H. E. Ciano with his family, and the vessel was christened by Mrs. Ciano. This motorship is 147.75 metres in length, 18.90 metres in breadth, and 10.65 metres in depth. The motorship *Remo* is of 11,000 tons deadweight and her contract speed is 13 knots.

The *Remo*, which is a sistership to the motorship *Romulo*, launched some few months ago, and which is to be employed together with her sister ship and also with the motorships *Esquilino* and *Viminale*, on the monthly passenger and freight service between

the Adriatic ports and the Far East, is a double bridge type vessel with fore, central and poop castles. Amidships is passenger accommodation for 50 passengers, including double berths cabins, and the dining saloon, while above is the verandah, the smoking room, the music and reading room and two special cabins.

The holds are fitted with six large hatches, each of which is served by sixteen electric winches driving ten derricks of three tons and six of five tons. The propelling machinery of the *Remo* will consist of two single-acting 4-stroke Diesel engines of 2,500 i.h.p. The engines consist of six cylinders each having a diameter of 740 mm, and 1,200 mm piston stroke.

Engineering Notes

Wah Tah Tobacco Co., Shanghai.—The Wah Tah Tobacco Company, Chin Shen Li, Elgin Road, Shanghai, which was opened in July, 1925, is establishing a factory of its own for the manufacture of cigarettes. Since its organization, the company has been marketing cigarettes of the Ning Shao Brand at \$165 per case, each case containing 50,000 cigarettes. The company is to manufacture two new brands, "Confucius" and "Mencius" which will be sold at \$350 per case. The proprietor is Hung Wei-ting and the manager Sun Yao-ting. The company has a sales office at 92½ Ming I Li, Nanking Road, Shanghai.

New Chemical Plant for Foochow.—Liu Chung-lun and other capitalists in Foochow have bought an old German egg powder factory, and are planning to reorganise it into a chemical plant. The promoters are now experimenting with the manufacture of wood alcohol by dry distillation of wood. The raw material used consists chiefly of the small branches and loppings of various kinds of hard wood obtained from Foochow neighborhood. The raw material is placed in a big iron distillery, which is sealed and heated until the liquid and gaseous matters in the wood are set free. The gas escaping from the distillery is collected and utilised as fuel and the liquid separated into wood alcohol and calcium acetate. The other by-product is charcoal. Over ten species of hard wood are being experimented with by the plant. The promoters will choose one or two species that yield the greatest amount of wood alcohol. The plant is also to manufacture egg powder and pine bark paper. Forty thousand dollars has been voted as current capital. The plant is to run under the direction of three foreign trained Chinese experts.

G. E. C. Contracts.—The General Electric Co., Ltd., London, has secured the following contracts for British machinery manufactured at the G.E.C. Engineering Works in Birmingham and Erith.

FOR SOUTH AMERICA.—One 2,000 k.v.a. single phase Turbo Alternator, 2,200 volts, 50 cycles, 3,000 rpm.

A SOUTH AFRICAN COLLIERY.—One 4,000 k.v.a. 3 phase Turbo Alternator, 6,600 volts, 50 cycles, 3,000 rpm. (Repeat order).

ADELAIDE MUNICIPALITY.—One 22,000 k.v.a. three phase GEC—Fraser and Chalmers Turbo Alternator, 6,600 volts, 50 cycles, 3,000 rpm, (Further to large contracts for Turbo Alternators, Converting Plant, and E.H.T. Switchgear).

A MIDLAND IRON WORKS.—Two H.P. Turbo Blowers, each capable of a normal duty of 20,000 cu. ft. of free air per minute against a pressure from 7½ to 10 lbs. per sq. in.

A GLASGOW SHIPBUILDING Co.—Four 165 k.w., compound wound Generators, 220 volts, 300 rpm. driven by Ruston Oil Engines.

FOR EXPORT TO SOUTH AMERICA.—Two 500 k.w., compound wound Rotary Converters, 460-500 volts; 200 volts, 3 phase, 60 cycles; 900 rpm.

Complete with high tension and low tension control gear.

A SOUTH AFRICAN MINING Co.—Mechanical parts only for One General Electric Winding Engine (Man Hoist), to wind 9,900 lbs. from 3,338 ft. in 117 seconds. BHP of motor—1,600.

A DURHAM IRON Co.—Extension to Coke Screening Plant supplied by Fraser and Chalmers Eng. Works, consisting of: Three 18-in. Belt Conveyors, 38-ft. 38-ft. and 25-ft. centers. One Single Deck Prefex Screen. One Double Deck Prefex Screen. Necessary chutes and steelwork.

RUGBY RADIO STATION.—Two steel plate cubicles, each containing high tension direct current Type V. single pole Oil Circuit Breaker, for use on an 18,000 volt circuit.

A MIDLAND FIRM OF ENGINEERS.—Two 10 ton Electric Overhead Cranes. One Magnet Equipment, consisting of 2—43" Magnets and motor generator set.

FOR EXPORT TO RUSSIA.—Ten 100 h.p. 3 phase slipring Motors 3,000 volts. 50 cycles, 730 rpm. for driving 45 ton haulages.

Ten 40 ph. 3 phase slipring Motors, 210 volts, 50 cycles, 480 rpm. for driving 20-ton Haulages, with control panels.

The Tumen River Bridge.—In June, 1926, an agreement concerning the construction of an iron bridge across the Tumen River was concluded between Tao Shan, Taoin (governor) of Yen-ki and Yotaro Suzuki, Consul General, Chang-chun.

Construction Cost.—G. Y. 300,000.

Construction engineers.—Qualified engineers, both Chinese and Japanese.

Construction cost shall be divided equally between Chinese and Japanese parties.

Abutments and piers.—Re-enforced concrete

Beams.—Iron.

Police Regulations, Customs Inspection, and Maintenance and Repairs of the bridge shall be settled separately.

Object of construction.—Passenger traffic and facilities for transportation.

Connection between the Tientu line and the Tumen line.

Traffic may be opened upon due consideration of the terms of both parties.

Singapore Dock Contract Placed with Tyne Firm.—

It is officially announced in London that the £1,200,000 contract for the British Admiralty dock at Singapore has been secured by Swan, Hunter and Wigham Richardson, Ltd., of Wallsend-on-Tyne. The contract will provide work for many men for eighteen months.

The placing of this contract simultaneously with several other large overseas engineering contracts is taken to be preliminary evidence of the revival in British industry which it is confidently anticipated will follow peace in the coal industry.

The question of the Singapore Dock has formed the subject of discussion at recent sessions of the Imperial Conference. The suggestion has been made that the British Dominions might between them share some of the cost, and this question is to be thrashed out by the Dominion's representatives and a definite resolution for or against participation passed at a future date. The British Admiralty decided some time ago that the floating dock should be built in Great Britain and assembled at Singapore. It will be towed to the base in Johore Straits.

The secretary of Swan, Hunter and Wigham Richardson stated in an interview:—"We have only just received the official letter and naturally are delighted. We felt pretty sure for some time that we would get it. We have built many floating docks; in fact, it is safe to say we have built most of the big ones which are now in various parts of the world. The Singapore dock will not be the biggest, and we can easily cope with the work at our Wallsend yard. No special alterations or arrangements will be necessary."

There has been great competition to obtain the contract, and some months ago S. F. Staples, of the famous firm of naval architects, Clark and Standfield, went out to Singapore as the representative of nine big shipbuilding firms who had been asked to tender for the construction of the dock. The object of his visit was to make inquiries regarding local conditions. The present Government, in 1925, decided to resume the Singapore Base project, which had been suspended by Ramsay Macdonald's administration. The Government's original estimate of the complete scheme was £11,000,000.

Despite the statement of the secretary of the contracting firm, it is thought that the dock will be one of the largest of its kind afloat, probably approximating to the 60,000 tons dock built by Armstrong Whitworth at Walker two years ago and now in use at Southampton. Some idea of what the size will be can be gained from the dimensions of the battleship Nelson, now nearing completion on the Tyne. This vessel is 702-ft., long and has a displacement of 35,000 tons. At Singapore the facilities for repair will require to be equal to the demands of the Nelson and perhaps still larger capital ships in the future. Work will be begun on the dock almost immediately. It is likely that it will be constructed in sections as was the Southampton dock. Thousands of tons of steel will be required, and this will mean a good deal to steel works (which have been idle for seven months), for platers, riveters and caulkers. The largest floating dock so far built by Swan, Hunter and Wigham Richardson was the Medway dock of 32,000 tons.

Tong Tai Foong Cotton Spinning & Weaving Machinery & Mill Provider.—The Tong Tai Foong Cotton Spinning and Weaving Machinery and Mill Provider is established at 39 Honan Road, Shanghai. The company is capitalized at \$60,000 and is chiefly engaged in selling imported spinning and weaving machinery and leather articles. The Tong Tai Foong Chalk Factory, 38 Tongshan Road, Shanghai, is owned and operated by the company. The manager is Jên Yu-chin.

Engineering Exhibition in Shanghai.—Forty-two engineering firms, 20 Chinese and 22 foreign, were represented at the Nanyang Engineering Exhibition held from October 9 to 17, at the Nanyang University, 862 Avenue Haig, Shanghai.

The following are the Chinese firms:

Name of Firm	Articles
Tai Shan Brick & Tile Co., 421 Lloyd Road, Shanghai.	Paving and face bricks, red ridge, tile.
Commercial Press, Ltd., Honan and Pao-shan Road, Chapei, Shanghai.	Chinese and foreign typewriters, drawing and printing machines.
Chinese National Engineering and Manufacturing Co., 43B Kiangse Road, Shanghai.	Electric fans, switchboard, panel, knife switch, transformer, 3 phase squirrel cage induction motor, hot iron porcelain counter-weight.
China Iron Works, Wentsopan, Woosung.	Cotton and Silk weaving machines, etc.
China Portland Cement Co., 62 Kiangse Road, Shanghai.	"Tai Shan Brand" Cement.
Chin Cheng Chemical Works Company.	Drawing Colors.
Sin Chung Engineering Co., Yien Chia K'ou, Tientungan Road, Chapei, Shanghai.	Vertical crude oil engine, 8 inches double rection centrifugal pump.
King Chen Paper Mill Co., 95 Rue Montaubau, Shanghai.	Papers and cardboard.
Yu Tsin Tannery Co., Ltd., Tientsin, China	Leather.
Lung Chang Paper Mill Co., 5 Lung Hua Road, Shanghai.	Wrapping and writing papers.
China Electric Company, Ltd., 1 Kiukiang Road, Shanghai.	Morse instrument, wire and electric supplies.
Hua Tung Machine Works, Ltd., Pao-shan Road, Chapei, Shanghai.	Binding machines, cutters and printing machines.
Yao Hua Mechanical Glass Co.	Glass and glass bottles.
Chung Cheng Machine Works.	Grinding machines.
National Pottery Co., 112 Szechuen Road, Shanghai.	Mosaic floor tiles.
Tangent & Co., French Concession, Tientsin, China.	Hinges, door-handles, door and window locks.
Hsi Teh Chi & Co.	Coke tiles.
Wong Ching Iron & Steel Works.	Railway and building materials.
Tien Chang Paper Mill, Co., Ltd., 1 North Kiangse Road, Shanghai.	Papers and cardboards.

Far Eastern Contract.—The British India Steam Navigation Company has recently placed an order with Messrs. Swan, Hunter, and Wigham Richardson, Limited, for a new vessel for their service.

Messrs. C. R. Turner, Limited, of Nottingham have received an order for 112 covered wagons for the conveyance of goods, from the Jodhpur Railway.

The Pulsometer Company Limited of Reading and London have been awarded a contract for the installation of a large ice making plant at Sarawak.

The Vulcan Foundry Company, Limited, of Manchester has been awarded an order to build 73 locomotives for the Indian Railway Department and also 8 locomotives for the Assam-Bengal system.

The High Commissioner for India has placed an order with the English Electric Company for new rolling stock equipment in connection with the electrification of the Kalyan section of the Great Indian Peninsula Railway. In all fifteen motor-coach sets and forty-two trailer-coach sets are to be supplied.

The Crown Agents for the Colonies announce having placed the following contracts. With Ruston and Horasby, Limited, of Lincoln a contract for a generating plant, with Brown, Bayley's steel works of Sheffield a contract for a considerable number of steel tyres, with Sir William Arrol and Company, Limited, a contract for a fifty ton floating crane has been placed.

The Assam-Bengal system has placed a contract for twenty-five heavy locomotives for freight haulage with Armstrong-Whitworth Company.

The Queensland Government has placed an order for two hopper barges each of 170-ft. in length, with Messrs. Ferguson Bros, of Port Glasgow.

Eastern Contract Placed in England.—A contract has been placed with Messrs Shroff Brothers of Sunderland for an oil tanker of 10,000 tons for the Hindustan Steam Shipping Company. The vessel will be engined by John Dickinson and Company of Pallion, Sunderland. It is stated that construction will be commenced immediately after the settlement of the long drawn out coal dispute.

Large Indian Railway Contracts.—During August the Leeds Forge Company, Limited, which is a subsidiary company of Messrs. Cammell, Laird, and Company, Limited, of Sheffield, booked several important contracts for rolling stock on various of the Indian Railway. It is to build 68 bogie rail and timber trucks for the North Western Railway, 112 bogie low-sided, and 30 bogie high-sided wagons for the Indian State Railways, 60 covered goods wagons and 10 timber trucks for the South Indian Railway, 20 covered and 20 high-sided goods wagons for the narrow-gauge line of the Bengal-Nagpur Railway, and 60 low-sided wagons for the Jodhpur Railway. All these vehicles are to be fitted with Sheffield-Twinberrow bogies.

Yi Tai Chien Machine Shop, Foochow.—The Yi Tai Chien Machine Shop, at Nantai, Foochow, has been in existence for over 20 years and is capitalised at \$30,000. It builds and repairs machines for steam launches, machinery for rice polishing and flour mills, and also machines for manufacturing tin lined tea boxes. The shop employs over 50 operatives.

Constructed Roads in Kwangtung Province.—According to latest reports received by the Public Roads Department of Kwangtung province from various districts, there are at present 1,624 *li* of public highway already opened to traffic, 2,415 *li* already built, 3,029 *li* with road beds completed and 1,171 *li* in the course of construction throughout the whole province as shown in the following table.—

District	Whole Length of Road Originally Planned	Already Constructed
Lungchün	80 <i>li</i>	5 <i>li</i>
Lufung	60 "	60 "
Sunning	205 "	73 "
Koiping	62.3 "	34.3 "
Loting	120 "	5 "
Koyiu	120 "	1 "
Sunwui	117 "	43 "
Heungshan	240 "	34 "
Yanping	180 "	70 "
Tungon	11 "	3 "
Haikang	366 "	240 "
Fachow	236 "	177 "
Yamchow	200 "	90 "
Hopu	" "	200 "
Limchow	310 "	290 "
Tsingyün	650 "	1½ "
Mencheong	262 "	252 "
Hweitung	185 "	155 "
Lokwei	120 "	120 "
Limko	171 "	171 "
Tenghai	86 "	86 "
Tanchow	60 "	60 "
Kiungshan	1,301 "	1,301 "

The roads already constructed in Sunning, Yanping, Haikang, Fachow, Hopu, Limchow, Mencheong, Hweitung, Lokwei, Limko and Tenghai are now opened to traffic. Reports from other districts in the province have not yet been received. Roads are also under construction at Shihing, Sheklung and Fatshan. The Shiu-chow-Pingshek Road is also being built.

In order to hasten the construction of roads, the Public Roads Department has drawn up and enforced a set of regulations governing the requisition of labor. These regulations require each male citizen between the age of 18 and 50 living within 10 *li* on both sides of the road to work four days at a wage of \$0.40 a day, of which only \$0.15 shall be paid in cash and the remaining \$0.25 a day or \$1 for the four days in Road Company stock. Anyone unwilling to work in person may contribute \$1 instead as investment in the enterprise.

Utility Launch for Singapore.—For harbour work in Singapore a 30-ft. standard utility launch has been ordered from the Bergius Co. She has a beam of 7 ft., and is to be quipped with a 15 h.p. Kelvin sleeve-valve engine.

Motor Roads at Fenghwa, Chekiang.—A motor bus service company organised at Fenghwa, Chekiang province, has been registered at the Industrial Commissioner's office. The company has completed a survey of the route between Hsiwu, Hsiuli, Chowkiatungmen, and Takiao, a distance of 20 li, for the building of a motor road. Construction will be started very soon. Another road between Kiangkow and Siaowangmiao has been improved by the Hwei Lu Motor Bus Service Bureau, and light cars have been running on this section this summer at a charge of 40 cents for a single trip per passenger.

Good Year for Shipping in Manchuria.—With the exception of the Ching Po Co., which is not adequately financed, all shipping companies on the Sungari and Heilungkiang Rivers have made handsome profits this year. The Government Navigation Bureau has netted a profit of \$700,000, the Tung Ya Co., \$300,000; the Kwang Sin Co., \$100,000; the Mail Boats Bureau, \$90,000. This success is due to four reasons: (1) unification of passenger and freight rates, fixed by the Shipping Merchants' Guild, and consequent freedom from cut-throat competition; (2) high water on the rivers; (3) suppression of bandit activities; and (4) good crops in the river valleys.

Lien Bik Knitting Mill, Shanghai.—The Lien Bik Knitting Mill, 191 Yuan Tai Li, Paoshan Road, Chapei, Shanghai, has increased its capital for the purpose of manufacturing raising and Rashal machines after German models by its Iron Works Department. The department was added to the factory in March, 1924, and since then has been able to turn out two kinds of machines; winding machines and handle circle knitting machines, which are adapted from foreign makes. The factory was organized in 1917 by two brothers, Chêng-po and Yuen-tzū Li with an initial capital of \$25,000. The factory itself is engaged in the manufacture of socks and stockings, gloves, scarfs, and sweaters.

Dairen to Instal Automatic Telephones.—The Telephone Administration of Dairen, Manchuria, is installing automatic telephones in place of the old system. New equipment has been ordered from America and the work of installation is expected to be completed before the end of the year.

Amoy-Changchow Railway.—The Ministry of Communications has appointed a commission of four railway experts, Sha Fu-chün, Chen Ch'ing-wen, Chen Mou-chieh, and Lin Tê-chêng, to make an estimate of the assets of the Amoy-Changchow Railway. The estimate is to be made with the intention of turning over the management to a group of overseas Amoy merchants represented by Huang I-chu. These merchants have been negotiating with the Ministry for some time, and are willing to refund \$1,100,000 advanced to the railway since its management was taken over by the Ministry some ten years ago. The line was constructed in 1908. The president of the company is Chen Pao-ch'un and the vice-president Yeh Shou-wang. The railway line is about 45 li long.

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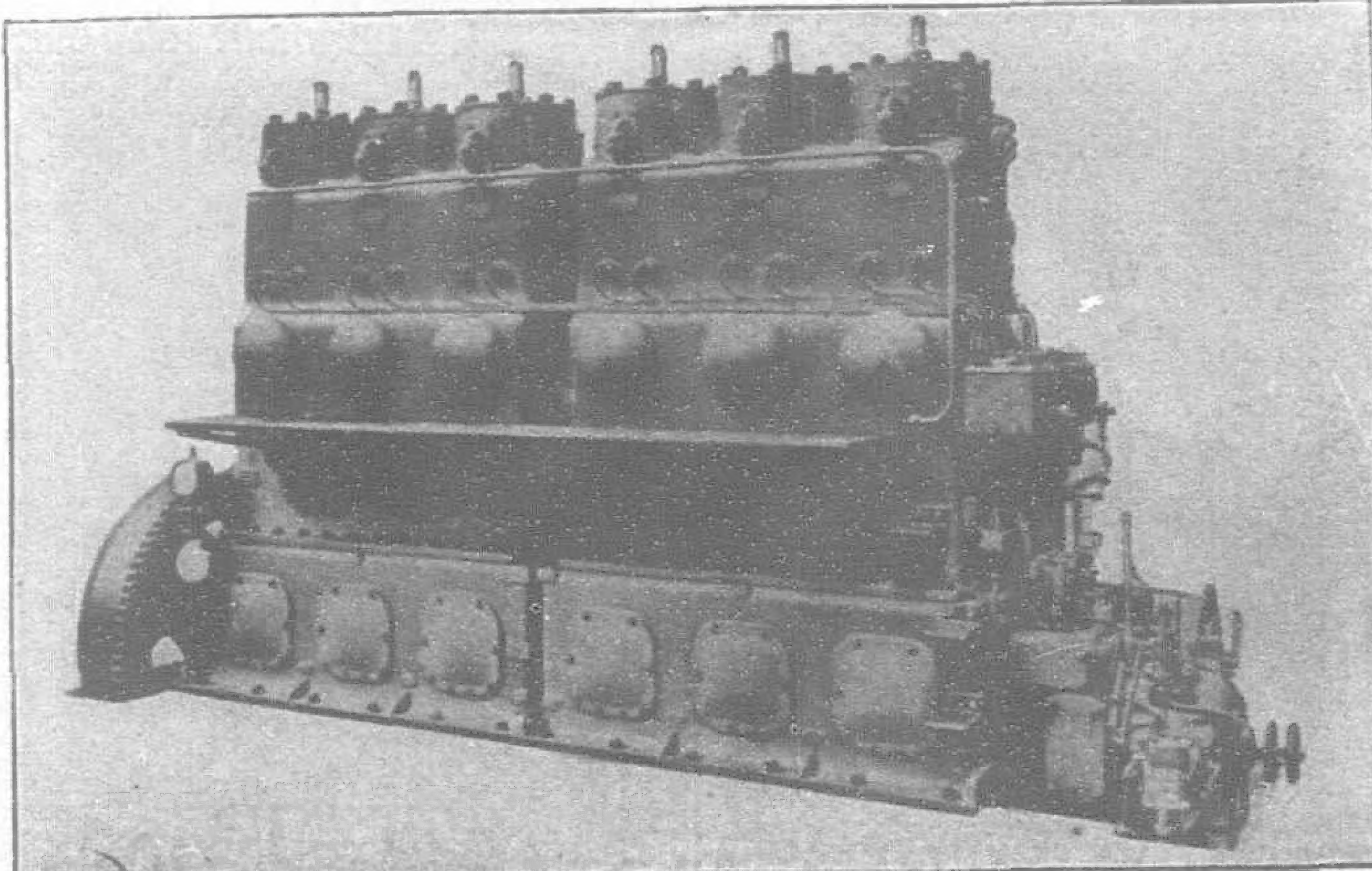
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WINTERTHUR. SWITZERLAND.

Motor Road in Shantung and Chihli.—In order to facilitate military transportation, the military authorities of Shantung and Chihli province have issued orders to the district magistrates concerned to hasten the construction of motor roads from Litsing to Hotse in Shantung province, from Tehchow, Shantung, to Tzechow, Chihli, and from Tsangchow to Shihkiachwang in Chihli province.

Electric Light and Tramway Company, Harbin.—The franchise to instal and operate an electric light plant and a tramway service in Harbin was granted to a Chinese syndicate by the Harbin municipal authorities in 1919. Before that time, lighting was supplied by small electric light companies, mostly financed by Russians. These plants were later bought by and merged into a Japanese company. The Chinese syndicate, after obtaining the concession, organised the Harbin Electric Light and Tramways Company with an authorized capital of \$10,000,000. Plans and specifications were drawn up for the work. To defray the initial expenses, about half a million dollars was advanced by the promoters. But owing to business depression in consequence of post war conditions in Europe, the promoters could not raise sufficient capital from private capitalists, and they were compelled to approach the government banks for aid. Advances were made by the Yung Heng Official Bank and the Fengtien and Heilungkiang official banks, amounting in total to about \$2,000,000, which was converted into Government shares. The company then became a Government and private joint enterprise.

According to the plan of the company, for lighting, an plant capable of producing 10,000 k.w. was to be installed. In regard to the tramways, the work was to be divided into three parts. The total length of the projected tramway was to cover about 22 miles, of which a section of about eight and half miles was to be constructed immediately, to run through the busiest quarters. The remaining 13½ miles were to be built in two periods later on. A contract was signed with an American company for the installation of the lighting system and the tramways at a total cost of \$6,000,000, of which \$1,000,000 was to be paid by the company, the remaining \$5,000,000 to be advanced by the American contracting firm in four periods. The latter, however, failed to advance the stipulated sums and the contract was cancelled. Another similar contract was later on awarded to the Siemens China Co. at \$2,520,000 for the construction of the first part of the program, which includes a lighting system and plant and eight and half miles of tramway with all necessary equipment to start operations. Construction was to be completed in 24 months after the signing of the contract. The second and the third part of the program, which are extensions of the tramway lines, are to be carried out at a total cost of about \$1,300,000. Work for the first part of the program is now in progress. Consignments of machinery have already arrived in Harbin.

The company is now negotiating with the Harbin municipal authorities for the extension of its working scope. The tramway lines under the present contract are considered by the company as being too short for successful operation. A request is also made for the extension of the term of franchise. A revised text of the original franchise has been drawn up and placed before the Harbin Municipal Council for consideration.

The company has recently issued a prospectus with estimates of probable profits. Its lighting plant will be capable of generating enough power for 10,000 25-candle power lamps. If each lamp is lighted, on the average, for 600 hours every year, the total yearly consumption of power will be 1,980,000 k.w., which, on the basis of 35 kopeks per unit, would net the company a yearly gross income of 703,500 gold roubles from the lighting department alone. The income of the tramways department is estimated at 300 gold roubles per car per diem. If 30 cars are in operation, the total daily receipts will be 9,000 gold roubles. If the working days of a year be estimated at 363, the yearly gross income of the tramways department would amount to 3,267,000 gold roubles, bringing the total yearly gross revenue of the company to 3,970,500 gold roubles.

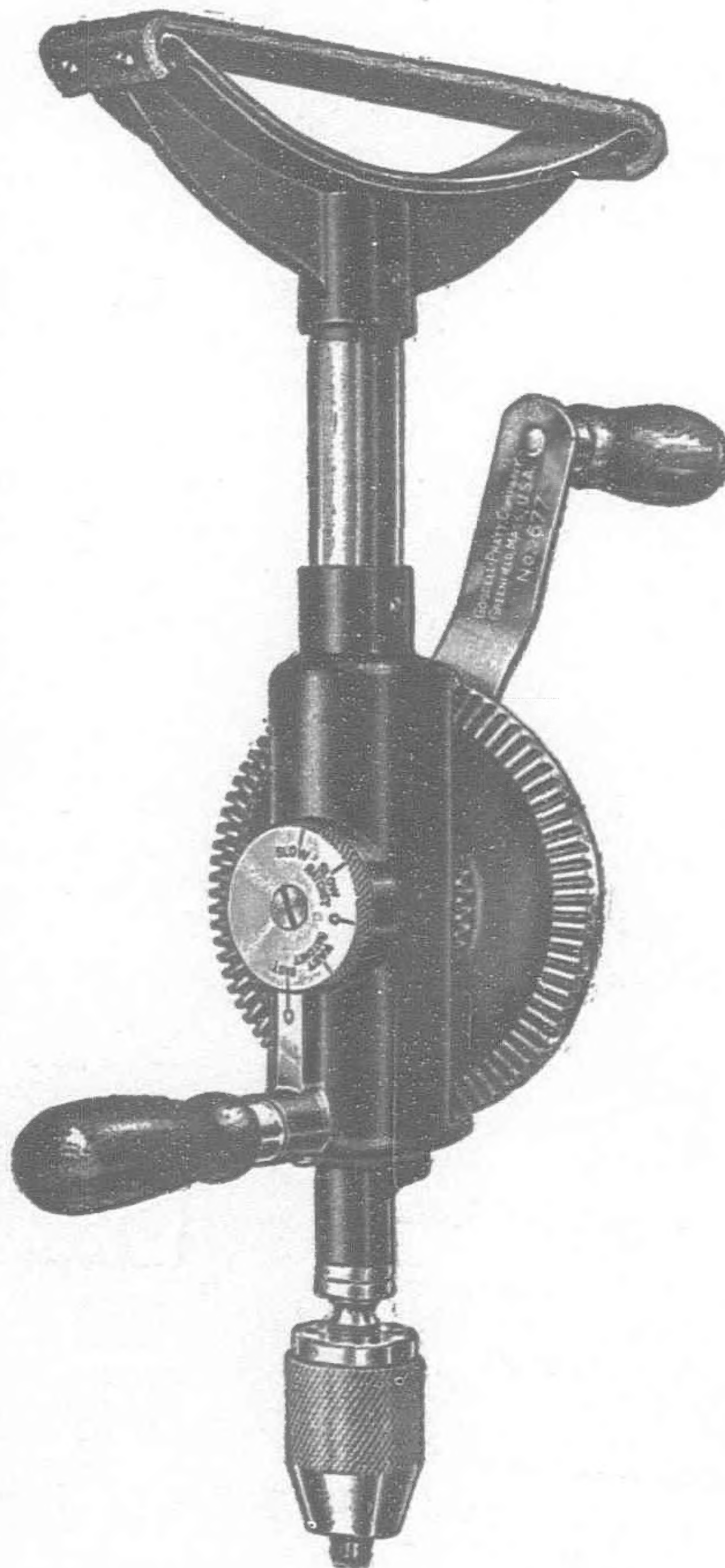
The annual cost of power consumed in the lighting department is estimated at 43,560 gold roubles and that consumed in the tramways department, 527,076 gold roubles and the various items of overhead expenses of the company, 700,000 gold roubles. By deducting these items of cost from the total gross revenue of 3,970,500 gold roubles an annual net profit of 2,699,864 gold roubles would be assured, according to the prospectus.

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